

# **ENCAD®**

## **NovaJet® 8-Head Family**

*NovaJet  
800 Series*



***Service Manual***





**NOVAJET®**  
**800 Series**  
**Color Inkjet Printer**  
**Service Manual**

Part Number 216520-01

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## **Printing history**

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## FCC Statement (U.S.A.)

The United States Federal Communications Commission has specified that the following notice be brought to the attention of the users of the **NOVAJET 800** series printers.

### FEDERAL COMMUNICATIONS COMMISSION RADIO AND TELEVISION INTERFERENCE FOR CLASS B DEVICE

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

## User Instructions:

If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by **ENCAD, Inc.** could void the user's authority to operate the equipment.

## VDE Statement

Hiermit wird bescheinigt, daß die **NOVAJET 800** Serie von Drucker in Übereinstimmung mit den Bestimmungen der BMPT-AmstbIVfg 234/1991 funktentstört ist. Der vorschriftsmäßige Betrieb mancher Geräte (z.B. Meßsender) kann allerdings gewissen Einschränkungen unterliegen. Beachten Sie deshalb die Hinweise in der Bedienungsanleitung.

Dem Zentralamt für Zulassungen im Fernmeldewesen würde dan Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf die Einhaltung der Bestimmungen eingeräumt.

**ENCAD, Inc.** U.S.A

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To obtain a Material Safety Data Sheet, contact **ENCAD, Inc.** at:

6059 Cornerstone Court West  
San Diego, CA 92121-3734  
(619) 452-4350

International users should contact their local dealer or distributor.

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## United States

ENCAD®, Inc., warrants its printers ("PRODUCT") to be free from defects in workmanship and materials for a period of one year from the date of purchase. In order to submit a Warranty claim, please contact the ENCAD Help Desk at (858) 452-4350.

ENCAD reserves the right to make changes or improvements to Products, without incurring any obligation to similarly alter Products previously purchased.

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This Warranty applies only to printers purchased from ENCAD, or authorized ENCAD distributors or dealers. The intent of this Warranty is to repair or replace defective Products subjected to normal wear and tear, when operated according to ENCAD instructions.

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# General Description

1

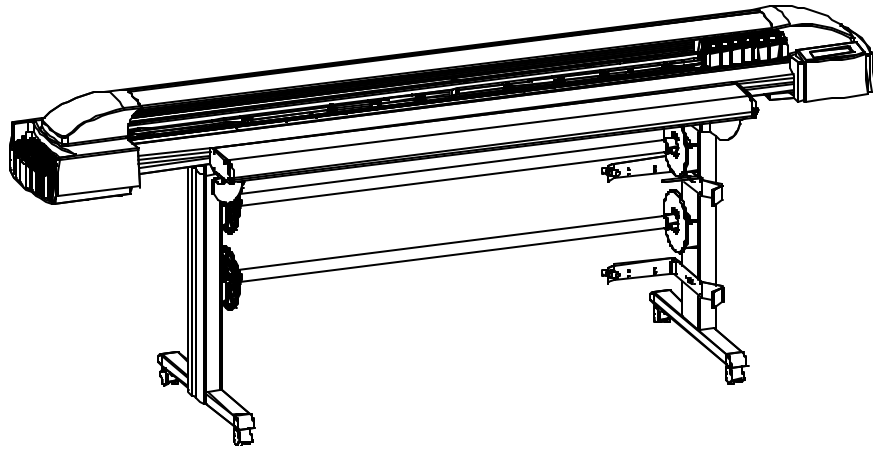


Figure 1-1. NovaJet 800 Series Inkjet Printer.

## Introduction

This manual provides service information for the **ENCAD®**, **Inc.** **NovaJet® 800 Series** Color Inkjet Printers. The **NovaJet 850** printer is available in two sizes: a 42 inch model and a 60 inch model. The **NovaJet 880** printer is available in a 60 inch model.

It is written for service personnel who possess analog and digital circuitry experience. Chapter 2, Theory of Operation, should be read and thoroughly understood before troubleshooting/calibrating the printers.

The printers support pre-cut and roll media. Media size is automatically determined and hardclip limits are set accordingly. Pre-cut media uses different maximum plotting areas than roll media. See the Printer Specifications in the User Reference Guide for more details on the media size printable area.

A Centronics parallel connection is provided to interface with the host computer. Commands sent from the host computer can be in several forms including **HP-GL/2**, **HP-RTL** and **Encad RTL** formats.

Drivers are supplied to support Windows®-based PCs (95, 98, ME, NT and 2000) as well as Macintosh and Power PC computers.

These printers expand upon *ENCAD's* tradition of delivering fast, high-quality color or monochrome graphics for a variety of applications. *ENCAD* has made significant advances in designing these printers to respond to and anticipate our customers' needs. Principal features are summarized below.

- Locally or Remotely Configured via Host Computer
- Powered Media Handling System
- Dynamic Thermal Drying System
- V8 12-Ink Line Delivery System
- Quick Ink Changeover
- Anti-Skew Pinch Rollers
- PowerPC 50 MHz Microprocessor
- 8 User Configurable Settings
- 208 Jet Ink Cartridges
- Ink Priming System
- 500ml Ink Reservoirs
- Smart Cartridges
- Media Tracking Function
- 10/100BaseT Network Interface
- Rigid Media Handling System (NJ880 only)

## Overview

Printers draw according to instructions issued from a “host” computer. Every printer is engineered to understand a specific set of instructions and to execute each instruction in a precise manner. In addition, most printers are designed to execute predetermined characters automatically without a specific line-by-line instruction from the program. These characters are part of the printer’s permanent memory.

## Related Publications

The following publication contains additional information which may be useful in servicing the **NovaJet 800 Series** Color Inkjet Printers:

? **ENCAD NovaJet 800 Series** Quick Start Guide,  
P/N 215360-XX

? **ENCAD NovaJet 800 Series** System CD-ROM,  
P/N 215363-XX

Copies of these and other **ENCAD, Inc.** publications may be obtained by contacting your nearest authorized **ENCAD, Inc.** dealer or by contacting **ENCAD’s** Technical Support and Service Department.

## Electrostatic Discharge (ESD) Sensitivity

All PCBs (Printed Circuit Boards) associated with these printers have components sensitive to ESD (electrostatic discharge). Care must be taken to avoid damage to any of the components by following current ESD handling procedures and practices.

Always use an approved ESD grounding strap when handling or working with PCBs.

## Warnings, Cautions and Notes

Warnings, cautions and notes are used when additional information, instructions or care should be observed. In this manual warnings, cautions and notes precede the text to which each applies. The definition of each is provided below.

**WARNINGS** - Warnings are used to stress that the following steps or procedures has the potential to cause serious harm or death to service personnel. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:



Followed by a paragraph describing the concern.

**CAUTION** - Cautions depict that the following steps or procedures can cause damage to the equipment if not properly followed. Extreme care should be observed when following the procedures and to exercise standard safety procedures. They are indicated by:



Followed by a paragraph describing the concern.

**NOTE** - Notes are placed before a procedure to inform the service personnel of specific details to improve quality, to give reminders of interrelated parts and to provide other helpful information. They are indicated by:

**NOTE**

Followed by a paragraph describing the concern.

Printer Specifications

The specifications and performance characteristics of the **NovaJet 800 Series** Color Inkjet Printers are as follows:

**Max Printing Area:**

	<u>42 inch</u>	<u>60 inch</u>
Norm	40.8"	58.8"
	1.04m	1.49m
Extend	41.61"	59.61"
	1.06m	1.51m

**Language Emulation:**

HP-RTL  
ENCAD RTL  
HP GL/2

**Buffer:**

64 MB installed  
upgradeable to 256 MB

**Power Requirements:**

Input Voltage:  
90-246 VAC  
47-63 Hz

Output Power:  
20 W idle  
185 W typical  
285 W maximum  
1485 W maximum (with  
dryer on)

**Resolution:**

600x600 dpi or  
300x300 dpi RTI

**Accuracy:**

+/- 0.2% line length using  
ROLL feed and 4 mil  
drafting matte film

**Interface:**

Centronics parallel  
(IEEE 1284)  
Network: via  
100BaseT Interface

**Certifications:**

Safety  
CSA, CSE/NRTL  
(equivalent to UL1950)  
TUV GS  
EN 50 082-1  
EN 60 950  
UL1950  
NOM-019-SCFI-1993  
IEC 950  
AS/NZS 3260

EMI  
FCC Class A  
CSA C108.8  
EN 55 022 Class A  
CE Mark  
CISPR 22- Class A  
AS/NZS 3548

<b>Environment:</b>	<b>Weight:</b>	<b>NJ850</b>	<b>NJ880</b>
Operating:	60"	165 lbs	235 lbs
65° to 85° F	42"	150 lbs	
(18° to 30° C)			
5% to 80% RH	<b>Dimensions:</b>		
non-condensing	Height	44"(1.12m)	48" (1.22m)
	Width	93" (2.37m)	
Storage:		<u>42 inch</u>	
40° to 95° F			
(4° to 35° C)		111" (2.82m)	111" (2.82m)
5% to 80% RH		<u>60 inch</u>	
non-condensing			
	Depth	28" (0.71m)	

**Contents of this Service Manual**

Figures are used in this manual to clarify procedures. They are for illustrative purposes only and may not necessarily be drawn to scale.

Material in this manual may be repeated in various chapters so that each chapter can “stand alone”. This allows information to be located without having to refer back and forth between chapters.

Figures and tables are easily located and cross-referenced, and are listed in the front of the manual under List of Illustrations and List of Tables.

This manual is divided into six chapters as follows:

Chapter 1 GENERAL DESCRIPTION - Contains a general description of the **ENCAD NovaJet 800 Series** printer. This includes printer specifications, and related materials. Also included is a description of the use of Warnings, Cautions and Notes as used in this manual and chapter contents.

Chapter 2 THEORY OF OPERATION - Functional descriptions of the overall printer and major assemblies are contained in this chapter.

Chapter 3 MAINTENANCE - This chapter covers the scheduled maintenance, cleaning procedures and alignment/adjustments recommended to perform on the printers. Diagnostics and a signal flow diagram are also listed.

Chapter 4 TROUBLESHOOTING - A table containing problems that could occur and possible causes and repairs is found in this chapter. This table is not intended to be a complete listing of troubleshooting procedures. It will isolate the problem down to the lowest replaceable assembly. If the problem happens to be the wiring between assemblies, standard troubleshooting techniques will have to be implemented to correct the problem.

Chapter 5 ASSEMBLY/DISASSEMBLY - Contains detailed procedures to remove and replace printer parts and assemblies.

Chapter 6 PARTS LIST - Contains a complete listing of all field replaceable parts and assemblies for the color inkjet printers. Illustrated parts breakdown drawings are included to help clarify and identify parts for ordering. Special kits and adjustment jigs may also be required.

**ORIENTATION** - Instructions in this manual are based on the assumption that the service person is facing the front of the printer. References to top view, back view, and so forth are consistent with this engineering standard. References to the X Axis and Y Axis (Paper Axis and Carrier Axis, respectively) follow the standard of **AutoCAD™** absolute coordinates: up and down for X, left to right for Y.

## Technical Support

*ENCAD* offers full technical support and service for its various products. If you are unable to find the answer to your question in either the User's Guide, Service Manual, or other related publications, check out *ENCAD's* Knowledge Base located on *ENCAD's* website support:

***ENCAD* Website:** <http://www.encad.com>

Additional information is available through our Technical Support and Service Department's Help Desk.

***ENCAD, Inc.***  
Technical Support & Service Dept.  
6059 Cornerstone Court West  
San Diego, CA 92121

**Help Desk Telephone:** (858) 452-4350 or  
(877) ENCAD-TS (362-2387)  
**Help Desk FAX:** (858) 558-4672

International users contact your local *ENCAD* service provider. See details on your *ENCAD* registration card.

## Introduction

This chapter explains the mechanical and electrical theory of operation of the **ENCAD NovaJet 800 Series** Color Inkjet printers.

The **NovaJet 800 Series** V-8 print engine has eight ink cartridges, eight 500-milliliter ink reservoirs and 12 independent ink lines. The cartridges are housed in a torque-free floating carriage assembly that eliminates micro banding by providing vibration-free printing. To ensure that prints are dry for unattended printing, the printer has a dynamic thermal drying system. The printer includes an optically controlled take up and feed system as standard equipment. Printer hardware features also include an easy-to-read LCD display. An integrated 100BaseT network connection provides seamless network and workstation communication. The printer power switch is located at the right rear of the printer.

The **NovaJet 800 Series** is a PowerPC 48MHz microprocessor-based digital printer that receives plotting instructions from a host computer through the Centronics parallel interface.

## NovaJet 800 Series Printers General Block Diagram

Figure 2-1 illustrates the major functional areas of the printers.

The **NovaJet 800 Series** printers consist of three mechanical assemblies:

1. Paper (Media) Axis Drive
2. Carriage Axis Drive
3. Media Feed and Take-Up System

and five main electrical assemblies:

1. Main PWA (Printed Wiring Assembly)
2. Carriage Assemblies (2)
3. Control Panel
4. Power Supply
5. Thermal Dryer Assembly

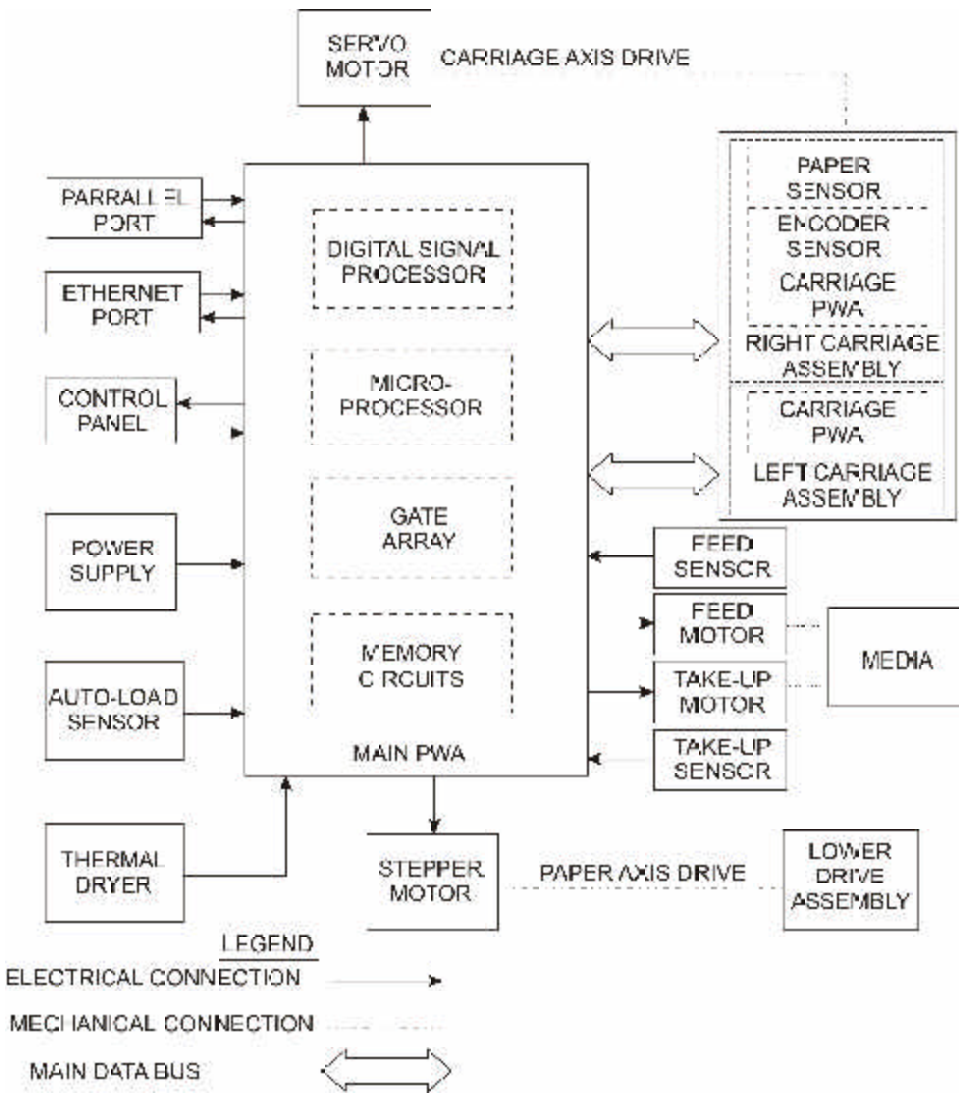
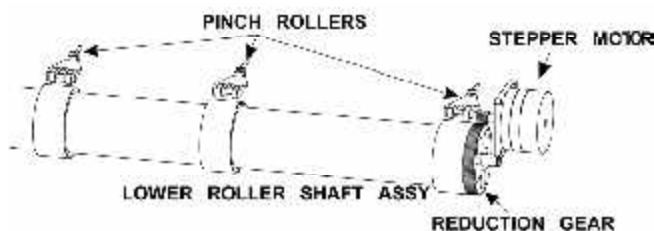


Figure 2-1. General Block Diagram.

## Paper (Media) Axis Drive



**Figure 2-2. Paper (Media) Axis Drive.**

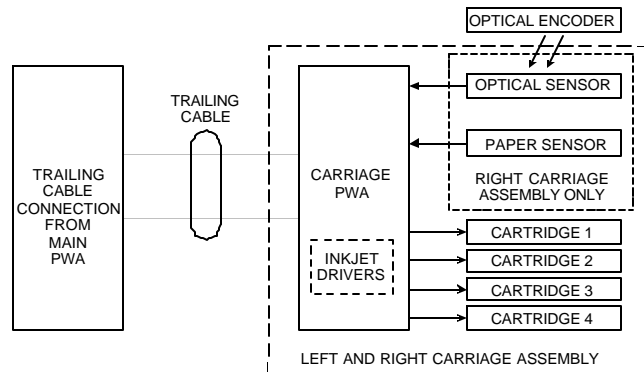
The Paper (Media) Axis Drive moves the plotting media in a direction perpendicular to the length of the printer. This friction drive utilizes a micro-step drive technology and consists of a stepper motor, reduction gears, lower drive shaft assembly, and pinch rollers. This can be seen in Figure 2-2.

The micro-step technology associated with the stepper motor gives the capability of a resolution up to 9600 dpi.

The reduction gear meshes the stepper motor to the lower drive shaft assembly which allows the media to advance or retract. The purpose of the pinch rollers is to apply pressure to the media onto the drive shaft assembly to reduce the chance of slipping.

Misaligned pinch wheels is a main cause of skewing of the media. For that reason the **NovaJet 800 Series** was designed with self aligning pinch rollers. As the media is fed forward, the rollers are aligned correctly. However, these pinch rollers will not stay aligned while the media is being fed backwards.

## The Carriage Axis Drive



**Figure 2-3. Carriage Axis Drive.**

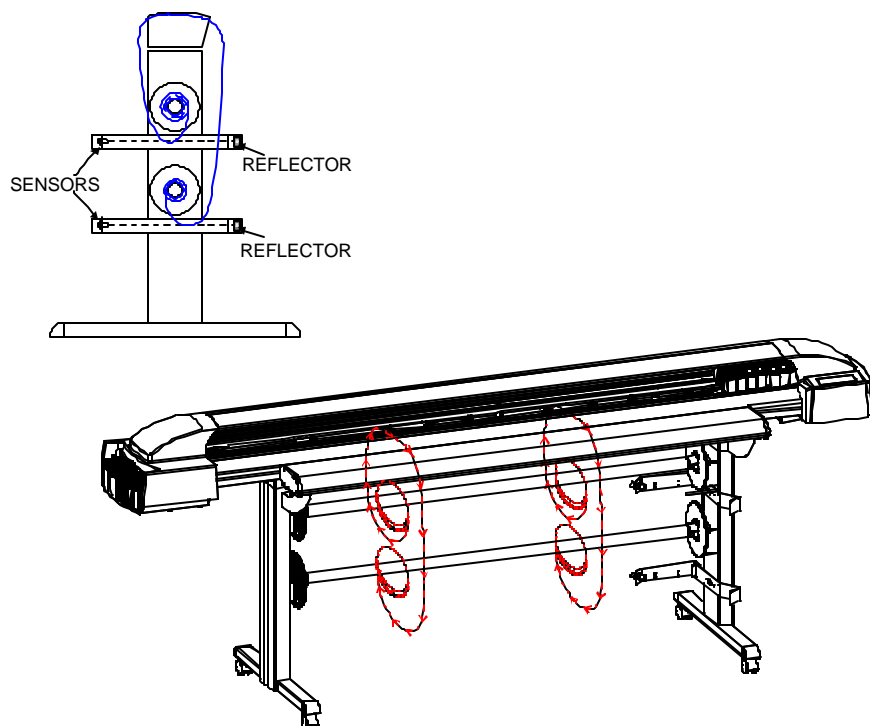
The Carriage Axis Drive moves the printer's carriage assembly along the length of the printer. The drive consists of a servo motor, linear encoder strip, drive belt, and tensioning assembly. These items are illustrated in Figure 2-3.

The servo motor, drive belt, and tensioning assembly are the components that actually drive the carriage assembly. The servo motor drives the belt back and forth allowing the attached carriage assemblies to be repositioned as required. The tensioning assembly is spring controlled and allows the proper amount of tension on the belt.

The linear optical encoder strip is used to obtain the printer's accuracy along the axis of the printer. The strip of film has 150 parallel lines per inch printed on it. By utilizing two optical encoder sensors that are slightly off set from each other, and reading the leading and trailing edges of the lines, a resolution of 600 dpi can be obtained.

The stepper and servo motors are controlled from the main printed circuit assembly by the microprocessor.

## Media Feed and Take-Up System

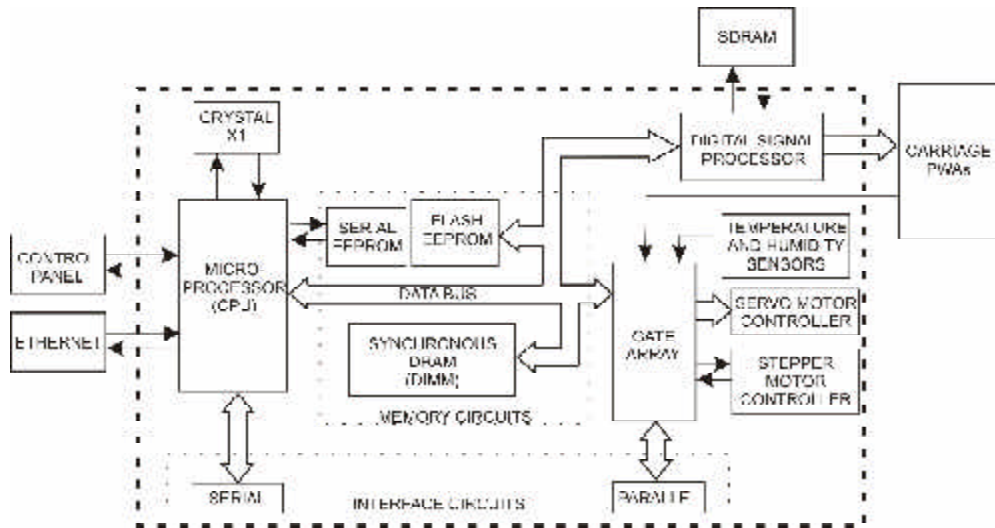


**Figure 2-4. Power Feed and Take-Up System.**

The media feed and take-up system comprises of two optical sensors, two dc motors and a dryer assembly. See Figure 2-4.

Motors are used to advance the media feed roll and the media take-up roll dependent upon the signals they receive from the Main PWA. The Main PWA generates the control signals for the motors from the information it receives from the media feed and take-up sensors. The Main PWA also controls the dryer assembly.

## Main PWA (Printed Wiring Assembly)



**Figure 2-5. Main PWA (Printed Wiring Assembly).**

The Main PWA (Printed Wiring Assembly) consists of seven functional areas:

1. Microprocessor (CPU)
2. Gate Array
3. Memory Circuits
4. Stepper Motor Controller
5. Servo Motor Controller
6. Interface Circuits: Serial & Parallel
7. Temperature and Humidity Control

## Main PWA LED Status Indicators

D1 - Normally flashes when the DSP is idle. Steady during print operations.

D8 - +24V available.

D9 - Normally flashes when the Power PC processor is idle. Stops flashing when processor is busy (i.e. during paper sensing operations or printing).

D10 - Normally OFF; Flashes during initialization, then turns off. LED staying on would indicate a problem when the FPGA is unconfigured. Ensures the gate array chips have been properly programmed (one on Main PWA and on each Carriage PWA).

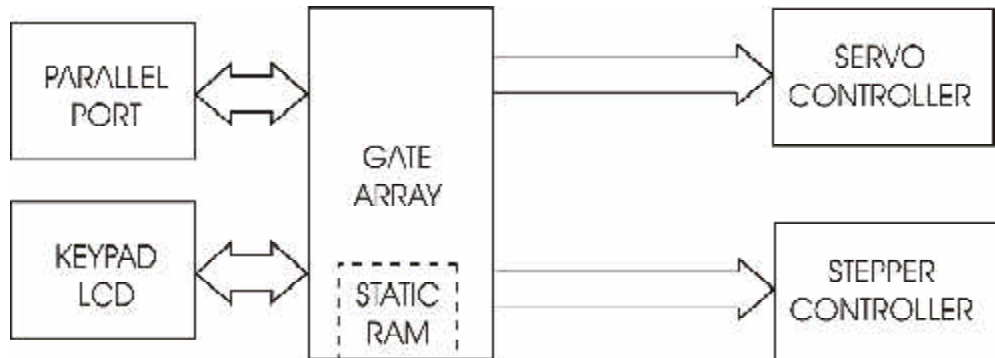
D13 - +5V available.

## Microprocessor (CPU)

The microprocessor (a 48MHz PowerPC 860 from Motorola) is the central processor unit which supervises system functions, executes the printer firmware, manipulates data, and controls input/output data busses. It has four built-in serial ports, a two channel DMA (Direct Memory Access) controller, a timer module, clock generator, and an on-board chip select generator. The serial ports are not used and are disabled in all shipping firmware. One DMA channel is used to receive data through the parallel port via the gate array. One timer generates a servo interrupt every millisecond; another is used to coordinate firmware multi-tasking.

The chip select generator is programmed to generate chip selects at the appropriate addresses, with the appropriate data size (byte, word) and with the appropriate number of wait states.

## Gate Array



**Figure 2-6. Gate Array.**

The gate array contains the hardware logic for dot firing, monitoring changes in the Carriage Assemblies position, controlling DMA through the parallel port, and generating the PWM (Pulse Width Modulation) waveforms for the servo controller. It also controls the stepper motor, LCD and keypad.

The gate array is a Xilinx device. It is a static RAM-based field programmable gate array. This means that the logic that it implements is determined by configuration information in internal RAM storage. Each time power is turned on, this information must be downloaded from the system ROM. This type of gate array allows for the flexibility of upgrading the logic by simply downloading the new system software.

## Digital Signal Processor (DSP)

The DSP converts raster data into the head buffer data format used by the printheads. The gate array tells the DSP when to send data to the carriage. The DSP runs at 192 MHz. It has 32M of dedicated SDRAM that is separate from the DIMM the PowerPC uses.

## Memory Circuits

Memory is used to retain large amounts of information. This information is stored in the device memory in the form of binary bits.

Printer memory consists of Flash EEPROM, SDRAM, and EEPROM.

Maximum installable memory is as follows:

SDRAM = 256 MB

Flash EEPROM = 2 MB

Serial EEPROM = 1KB

## Flash EEPROM

Flash EEPROM is Electrically Erasable, Programmable, Read Only Memory used to store instructions and data constants which the micro-processor can access and interpret, with no loss of information when power is off.

The system firmware is stored in Flash EEPROM. The Flash EEPROM allows the firmware to be upgraded by downloading the files containing the new firmware. It can be erased and reprogrammed more than 10,000 times. The term “Flash” means that bytes cannot be individually erased. A block or the whole device is erased at the same time and the block or whole device is then reprogrammed.

The normal method of downloading new firmware is to send the unit the files containing the code using either the GO.EXE utility or printing the file to the unit. This requires using an appropriate host utility and can be done through the parallel port. See Firmware Downloading in Chapter 3 for the procedures.

## SDRAM

SDRAM is Synchronous Dynamic Random Access Memory, which provides temporary storage of the microprocessor calculation and input/output data. It is also a faster type of memory than the Flash EEPROM. That's why the printer control program is also copied from the Flash EEPROM to RAM, where it can be executed faster.

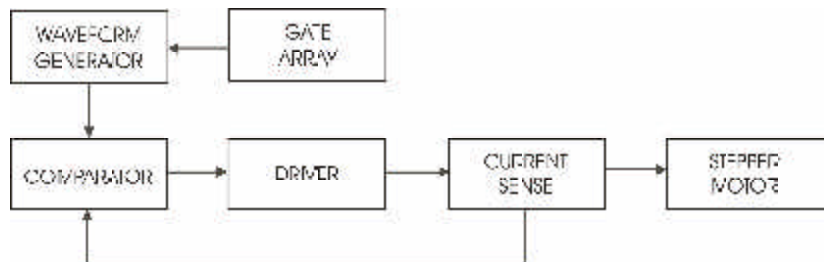
All printers ship with 64 MB of RAM and are upgradable to a maximum of 256 MB. Additional memory helps to free the host computer more quickly. Printer memory may be upgraded by installing PC100 (or faster) 168-pin DIMMs or Dual In-line Memory Modules. The printer will accept 64 MB, 128 MB or 256MB DIMMs.

## Serial EEPROM

Serial EEPROM is an Electrically Erasable, Programmable, Read Only Memory which provides storage for calibration constants and user configuration data entered from the host computer.

An 8K bit serial nonvolatile EEPROM stores calibration and configuration information. It retains data while the unit is off.

## Stepper Motor Controller



**Figure 2-7. Stepper Motor Controller.**

The media is driven by a Stepper Motor, which drives the media in a direction perpendicular to the width of the printer. The media in the printer can advance forward and backward, depending upon the

commands which the Stepper Motor receives from the microprocessor.

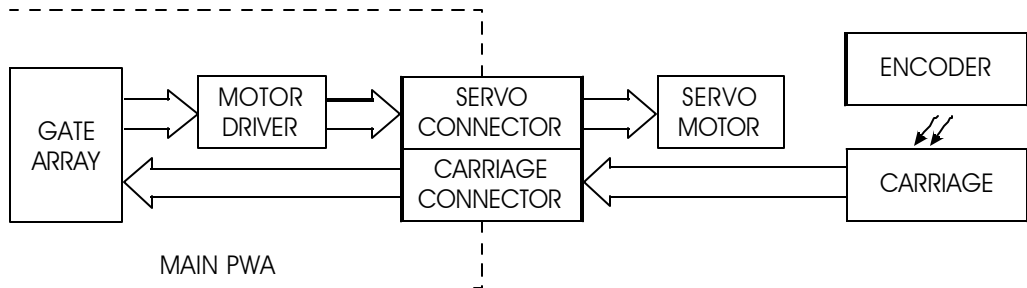
The Stepper Motor Controller contains two identical circuits, one for each winding of the stepper motor. The circuit is a combination of two simpler types of circuits and can be thought of as a variation of either one.

A waveform generator receives digital data from the gate array and generates a sine wave output. This signal is fed into a comparator circuit that is measuring the current through the winding of the stepper motor. If the current is too low, a pulse of 24V is generated. When the current goes above the output of the waveform generator, the pulse turns off. Every time the output of the waveform generator is changed by the microprocessor, the motor moves 1 “micro-step”.

Each circuit contains four main functions (see Figure 2-7):

1. **Reference waveform generator** - the gate array uses a D/A (digital to analog) converter to set the desired level for the current in the stepper motor winding. The output of the D/A converter varies in time to create a reference waveform. This reference waveform is centered around 2.5V.
2. **Motor current sense** - the voltage across a series current sense resistor is measured and level shifted so that it is centered around 5V.
3. **Comparator** - this portion divides the output of the reference waveform generator by two and compares it to the output of the motor current sensor. Logic inside the gate array generates the control signals for the power driver that applies voltage across the motor winding in order to make the actual current match the reference waveform.
4. **Power driver** - an H-bridge allows the supply voltage to be applied across the winding in either polarity used to drive the current level to the desired value.

## Servo Motor Controller

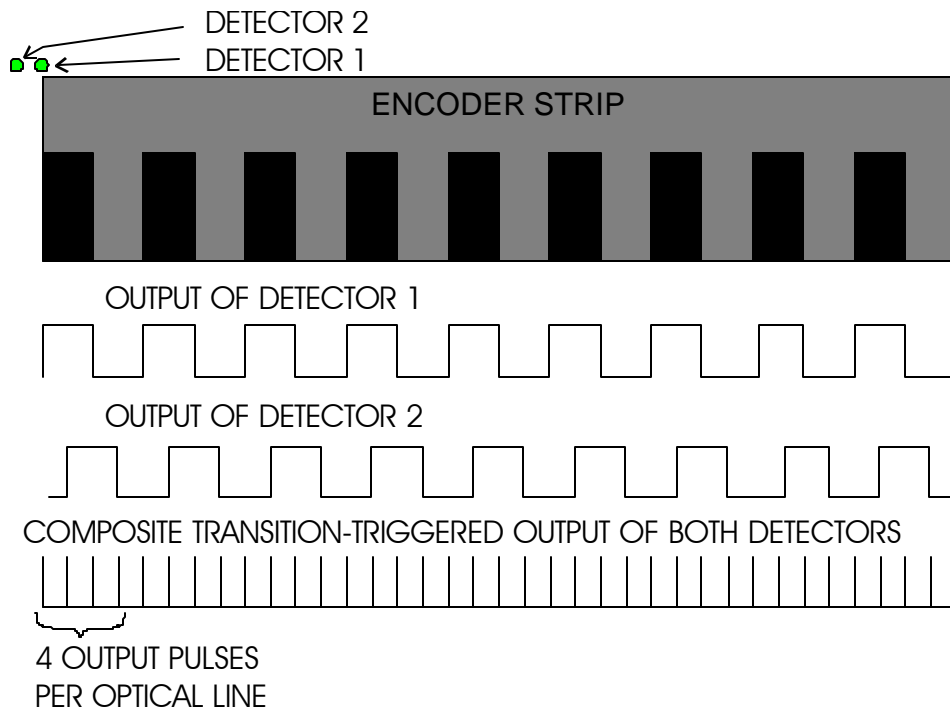


**Figure 2-8. Servo Motor Controller.**

The Carriage Assembly is driven by the Servo Motor. The speed of the Carriage Assembly is controlled by varying the duty cycle of the signal applied to the controller. The microprocessor checks the position of the Carriage Assembly approximately 1,000 times per second (during the servo interrupt). It then updates the PWM (pulse width modulator) register in the gate array which sets the duty cycle to make adjustments to the Carriage Assembly speed. A linear optical encoder is used to monitor the Carriage Assembly position.

The optical encoder strip runs the length of the Stabilizer Bracket and contains 150 lines and spaces per inch. Thus there are 300 edges per inch. The detector circuit actually consists of two optical edge detectors. They are separated from each other by one half the width of one of the optical lines on the encoder strip. This allows 4 evenly spaced pulses to be developed for each line on the encoder strip. This is known as quadrature signals. It gives an effective resolution of 600 lines per inch. See Figure 2-9 for a graphical representation of quadrature signals.

Maximum velocity of the Servo Motor is 46.6 inches per second (IPS). Servo Motor life is rated to 2.8 million cycles or approximately 2800 plot hours.



**Figure 2-9. Quadrature Signal Generation.**

The direction that the Carriage Assembly is moving is calculated based upon the state of one detector's output and the direction of the transition of the other detector's output.

A hardware counter in the gate array increments as the Carriage Assembly moves left and decrements as the Carriage Assembly moves right. The hardware counter is only eight bits wide, so it cannot store a value large enough to represent an absolute Carriage Assembly position. Instead, it is read during the servo interrupt and its value compared with that from the previous interrupt. This difference is used to update the absolute position value in the software.

## Interface Circuits: Serial & Parallel



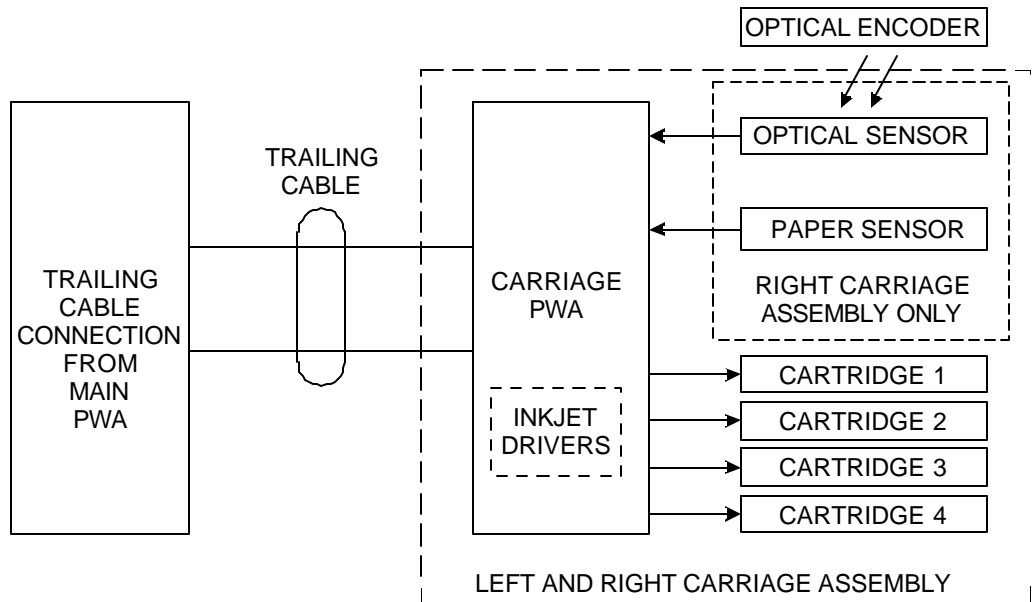
**Figure 2-10. Interface Circuits.**

Data from the host computer is received through the Centronics parallel port. The gate array provides the control signals for DMA transfers from the parallel port to SDRAM.

The serial port is not used.

Possible solutions for the Macintosh computer user include using the print server device with an established network or installing a parallel port add-on card in the computer to interface with the printer.

## Carriage Assembly Circuits



**Figure 2-11. Carriage Assembly Circuits.**

The Right Carriage Assembly contains:

- 1) Carriage PWA
- 2) Optical Sensors
- 3) Paper Sensor
- 4) Inkjet Cartridges

The Left Carriage Assembly contains:

- 1) Carriage PWA
- 2) Inkjet Cartridges

NOTE: The carriage housing has been modified from that of the Right Carriage Assembly. The belt strain relief has been removed and the encoder sensor clip has been removed.

The Right Carriage PWA contains the logic and drive circuitry for the firing of the inkjet cartridges. It also establishes an interface path for the optical sensor and paper sensor to communicate with the Main PWA.

The optical sensors receive their inputs from the optical encoder strip and sends this data to the Main PWA. The Main PWA uses this information to determine the horizontal position of the carriage assembly so that accurate printing can be established.

The paper sensor circuitry senses for the presence of loaded media. It does this automatically during the start-up and load sequences. It also constantly monitors the media during printing to determine if the media has run out.

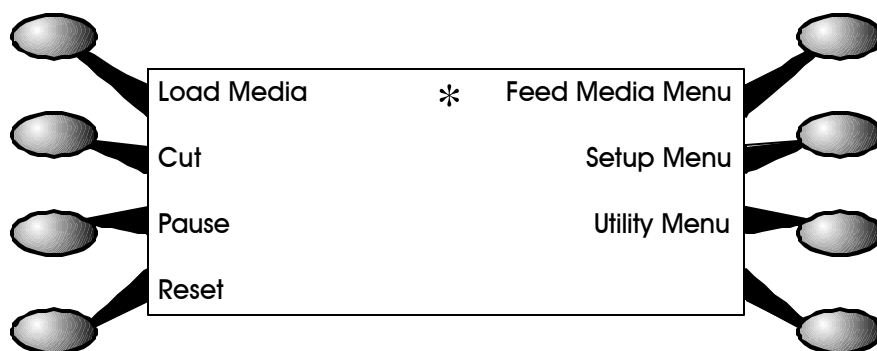
If no paper is sensed, the paper sensor sends this information to the Main PWA, which immediately begins an 'out of paper' subroutine. This subroutine stops the printer from printing until more media is loaded. NOTE: Space lighting must be at a constant level or the paper sense circuitry will create an error and print operations will cease.

The sensor also checks for the size of the media loaded so it can determine the proper printing parameters.

The Green LED on the Right Carriage and Left Carriage PWA indicates the proper drive voltage is available for the driver ICs. It is dim when the printer is idle but becomes bright during printing.

## Control Panel

The Control Panel is located on the right side of the printer and consists of 8 variable-action control buttons and an LCD graphics display. The control buttons are assigned to different functions and are dependant upon the selections that were previously selected. There are four buttons on the left of the display and four buttons on the right, with the display showing up to eight possible selections.



**Figure 2-12. Main Menu.**

Figure 2-12 shows the keypad after the printer has been turned on and finished the start up process. As seen in the figure, the control buttons are assigned to the corresponding command that is displayed closest to the physical location of the button.

## Power Supply

An internal UL recognized switching power module supplies power for the printers. It provides a constant 24VDC output from input voltage in the 90-132 VAC and 180-246 VAC ranges. A power switch turns the power on and off. The 24VDC is applied to the MPCB where it is further regulated and separated into 1.8VDC, 3.3VDC, and 5VDC. The 24V supply is used for: the stepper controller (which advances the paper); the servo controller (which moves the Carriage); and power to fire the inkjets. The 5V and 3.3V supply powers the logic circuits. The 1.8V powers the DSP.

The power supply is fused using a 6.3A 250V fast blow type fuse.

The outputs share a common ground which is isolated from earth ground within the supply itself. Earth ground and DC ground are connected external of the power supply.

The power supply will shut down under overload/short circuit conditions on any output over the full range of input voltage. Overvoltage protection is 20%-30% above nominal for the 24V output.

## **Thermal Dryer Assembly**

To ensure prints are dry for unattended printing, the printer features a thermal (hot air convection) drying system. The system monitors the temperature and humidity in the environment and adjusts the heat to optimize drying time and ensure consistent image quality. The fans blow air past 1200 watt heating elements, quickly drying the media. The dryer effectively dries prints up to 100 sq/ft/hr @ 250% ink saturation. The dryer system easily mounts to the stand assembly. The dryer logic cable connects the dryer to the right leg logic jack. The dryer power cord plugs into the power entry module at the rear of printer.

The thermal drying system is composed of the dryer plenum, logic cable, and Main PWA (humidity and temperature sensors). The dryer typically stays on for approximately 3 minutes following a print job when the Dryer is in the on mode. Auto-Cut Delay is the time set between successive print jobs (dry time between prints).

The Dryer PWA has two thermistors which provide feedback to the Main PWA firmware to raise or lower temperature inside the plenum. The firmware in turn drives the dryer PWA Triac (attached to heatsink) to deliver the current to the two 1200-watt heating elements. The dryer may be turned on, off, or placed into the auto-mode. The maximum temperature obtainable is approximately 52 degrees Celsius. The 60" unit runs a little cooler than the 42" platform due to the additional length of the 1200-watt heating elements (twin 500 to 600 watt elements). The glass fuse on the Dryer PWA will normally fail before an active component due to an overcurrent condition.

The Main PWA has a humidity sensor and a temperature sensor mounted to the back side. The sensors monitor ambient room temperature and humidity. Prior to print operations the printer should be allowed to acclimate to the environment for at least 15 minutes. The plenum may be preheated using the F6 key (2nd key from the top at right side of control panel) under the Sensor Status Menu.

The Dryer PWA is internal to the right side of the dryer plenum. The green LED (D2) on the Dryer PWA indicates that the triac is functioning properly and that power is applied to the two heating elements.

## Sensor Status Menu

From the top-level menu of the printer, navigate the menu tree as follows.

- Utility Menu
- Service Menu
- Diagnostic Menu
- Accessory Menu
- Sensor Status

The printer LCD will display the following information:

Dryer Mode: ccccccc  
Plenum T. = ## deg. C  
MBoard T. = ## deg. C  
MBoard H. = ## pct. RH

Available mode readouts include: On, Off, Auto and Disabled.

The optical sensors are designed to inform the Main PWA when there is not a proper amount of slack in the media by sensing the ‘curl’ of the media at the bottom of its loop. This method is used so that all approved forms of media (including transparent backlit media) is able to take advantage of the power feed and take-up system.

## Beeper and Fans

The beeper contains built-in driver circuitry so that it beeps under firmware control. The beeper alerts the user to error conditions.

There exists three types of fans that can be on these printers.

A single fan, located below the power supply, is used for cooling the power supply. Air blows over the power supply and the heated air is forced out the back of the printer. It also blows air on the temperature and humidity sensors so they can measure ambient conditions more accurately.

A fan is located inside the platen with its fan vent seen from under the platen on the right side of the printer. This fan provides suction on the platen bed and holds the paper (media) flat during the printing process. The 60 inch model has an additional suction fan located near the center of the printer inside the platen.

Two fans are located inside the dryer plenum body to draw ambient air inside to be heated. These fans are tested when power is applied to the printer.

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## Introduction

This chapter contains general maintenance and cleaning instructions for the **NovaJet 800** series printers.

## Scheduled Maintenance

Scheduled maintenance consists of a list of checks that are planned to be performed on a regular basis or when conditions warrant it.

Scheduled maintenance can be thought of as preventive maintenance since its purpose is to prolong the life of the printer. It is not intended to repair or isolate an existing problem, though it can sometimes be helpful in detecting a condition due to a weakened component that has not yet completely failed.

Below is a list of scheduled maintenance checks and their recommended periodicity.

Clean external areas:	weekly, or as required
Clean slide shaft:	weekly
Clean service station:	daily
Clean encoder strip:	weekly
Clean trailing cables:	bi-weekly
Clean platen surface/vacuum holes:	monthly
Clean cartridge dimples:	if prime fails
Clean flex cable contacts:	if prime fails, or cartridge is replaced
Clean and inspect motor gears:	annually
Clean and inspect Main PWA:	annually
Clean and inspect carriage assembly:	annually
Clean dryer assembly	monthly
Reseat connectors on Main PWA:	annually
Reseat connectors on carriage boards:	annually
Replace trailing cables	every 2000 plot hours
Replace carriage cover bushings (2 total):	every 2000 plot hours
Replace carriage bushings (4 total)	every 4000 plot hours

## Cleaning Procedures



Always turn the printer OFF, remove the power cord and the interface cable before cleaning the printer. An electrical shock hazard may be present if these procedures are not followed.

### External Cleaning



Do not use abrasive cleansers of any sort on the surfaces of the printer. Damage to the surface may result.

The exterior surfaces of the printer may be cleaned with a soft cloth which has been dampened. For more persistent stains, a small amount of liquid detergent may be used. Cleaning intervals are determined by the environment in which the printer is used.

### Slide Shaft Cleaning



Use only isopropyl alcohol on the slide shaft of the printer. Damage to the stainless steel slide shaft may result if cleaned with water and not completely dried off.

Printer problems can be caused by an accumulation of dirt or other contamination on the slide shaft. This contamination may lead to drag on the carriage. Extreme drag results in a “carriage axis failure” fault and will stop the carriage motion. These problems may be eliminated by maintaining and cleaning the slide shaft at intervals determined by the environmental conditions. **Do not use any lubrication.**

**To clean the slide shaft:**

1. Turn the printer OFF. Disconnect the power cord and interface cable.
2. Raise the printer lid.
3. Moisten a clean cloth or paper wipe with isopropyl alcohol.
4. Wipe the length of the slide shaft with the moistened cloth or wipe.
5. Manually move the carriage assembly from side to side.
6. Wipe the shaft again to remove any deposits left from the carriage.
7. Close the cover and reconnect the power cord and interface cable, turn the printer ON and perform the PRIME procedure. Be sure that the carriage moves freely on the slide shaft.

**Service Station Cleaning**

Ink and dust may build up on the service station, resulting in contamination which may smear the prints. The service station is cleaned as follows:

1. Turn the printer OFF. Disconnect the power cord and interface cable.
2. Raise the printer lid.
3. Carefully move the carriage toward the center of the printer.
4. Using a cotton swab dampened with distilled water, wipe the seals and the rubber wiper in the service station until no more ink residue or dust can be removed.
5. With a dry swab, wipe all moisture from the seals and wipers.
6. Close the lid and reconnect the power cord and interface cable.

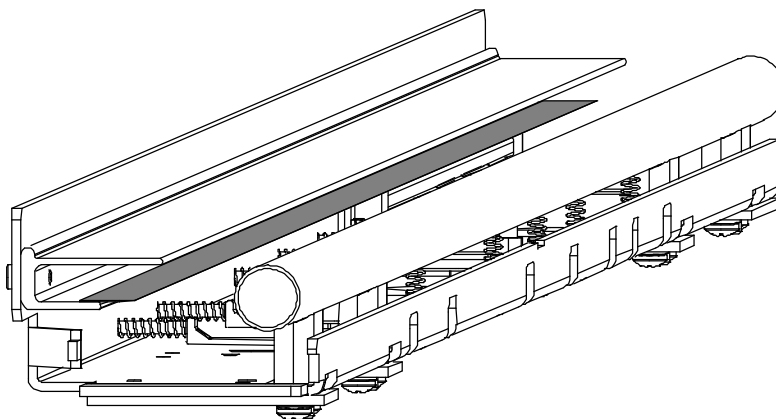
7. If the service station is filling with ink or very dirty it can be removed and rinsed under warm water. To remove, pull the tab on the right side of the service station and lift out. Wash, dry thoroughly and replace by placing the left side in first then pushing down on the right side until the tab locks it in place.

## Linear Encoder Strip Cleaning

Clean the linear encoder strip weekly or as necessary to remove any buildup of debris. Distilled water or isopropyl alcohol may be used. You may notice that it tends to fog the encoder strip; however, no detrimental effect has been observed in the field.

### To clean the Encoder Strip:

1. Disconnect the power cord and interface cable.
2. Slightly dampen a cotton swab with distilled water and wipe along the length of the encoder strip on both sides. Do not use denatured alcohol, MEK, acetone or keytone substances on the encoder strip as this is known to have caused damage to the encoder strip.
3. Reconnect the power cord and interface cable.



**Figure 3-1. Encoder Strip Cleaning.**

## **Trailing Cables Cleaning**

Clean the trailing cables bi- weekly or as necessary to remove any buildup of debris. Distilled water should be used. Do not pull too hard on the trailing cables or damage may occur.

### **To clean the Trailing Cables:**

1. Disconnect the power cord and interface cable.
2. Slightly dampen a lint-free cloth with water and wipe along the length of the trailing cables on both sides. Ensure the encoder stabilizer bracket surface is thoroughly cleaned. Clean the lower surface of the rear cover on the left side of the printer.
3. Reconnect the power cord and interface cable.

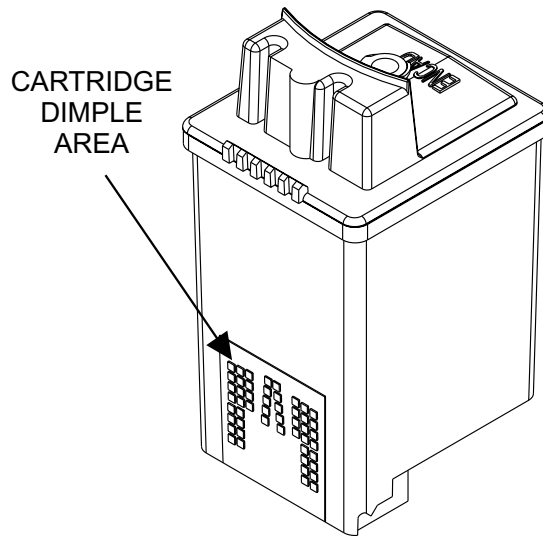
## **Platen/Vacuum Hole Cleaning**

To clean the external surfaces of the printer. Dampen a lint-free cloth with water and wipe all surfaces of ink and debris. Ensure the platen surface is thoroughly cleaned.

To clean the platen vacuum holes obtain a toothpick and gently remove lint and media fiber from platen holes. Caution: do not push lint through platen holes or problems with the stepper motor gearing may eventually occur leading to microbanding in image output.

If the platen holes are not cleaned periodically then adequate vacuum suction be not be available to pull media down during print operations.

## Cartridge Dimples Cleaning



**Figure 3-2. Cartridge Dimple Region.**

The cartridge dimple area can easily be contaminated by oils and dirt on fingers and hands or ink spilled onto them. This causes the cartridges to not receive some of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

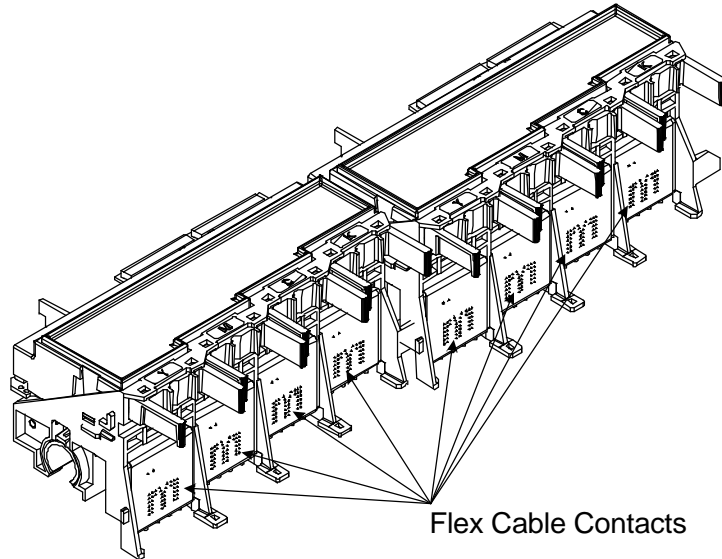
### **NOTE**

Care should be used when handling the cartridges. Avoid touching the cartridges on the dimple area or on the inkjet holes on the bottom. The oils and dirt on fingers and hands can contaminate the area and result in misfiring of the inkjets.

Clean the cartridge dimple area by gently dabbing the area with a lint free cloth or cotton swab saturated with isopropyl alcohol.

Be sure to clean the yellow cartridge because it is not readily apparent that it is dirty. The yellow ink is hard to see and could be overlooked.

## Flex Cable Contact Cleaning



**Figure 3-3. Flex Cable Contacts.**

Cleaning the flex cable contact area is very important due to the ease with which this area can become dirty. The flex for the yellow cartridge is deceiving because it is not readily apparent that it is dirty. This also causes the cartridges to not receive all of the electrical signals for a proper firing of the jets. This can be seen as a misfiring of the cartridge.

## **NOTE**

Be careful when handling the flex cable contact area. Avoid touching the contact area because oils on your skin can contaminate the area and result in misfiring of the inkjets.

Clean the flex cable contacts by gently dabbing the area with a cotton swab soaked with isopropyl alcohol.

## **Clean and Inspect Stepper Motor Gears**

The stepper motor gears can become dirty after time (typically after 4-5 years of operation) if not cleaned. Dirty gears can cause microbanding in the print. This will reduce the quality of the output. Clean the motor gears with a stiff brush to knock off any debris. A cotton swab soaked isopropyl alcohol can be used to remove any ink that may have accumulated on the gears.

## **Clean and Inspect Main PWA**

Foreign material on the Main PWA could short out electrical signals being developed on the Main PWA and cause erroneous prints or even damage to the Main PWA. All electrical circuits should be free of foreign material, especially those materials with conductive properties.

Clean the Main PWA by blowing the objects away or gently brushing them aside with a soft brush if required.

Inspect the Main PWA for any damage to the board, connections, or any of its components. Replace the board if inspection reveals any damage or flaws that could affect its function.

## **Clean and Inspect Carriage Assembly**

Foreign material on the carriage assembly could short out signals being developed on the carriage assembly and cause erroneous prints or even damage to the carriage assembly. A very common problem occurs when ink has been spilled onto the carriage assembly. All electrical circuits should be free of foreign material, especially those with conductive properties.

Clean the carriage assembly by blowing the objects away or gently brushing them aside with a soft brush if required. Be careful not to let anything fall into the printer as you clean or it could cause a new problem.

Inspect the carriage assembly for any damage to the boards, connections, or any of the components on the assembly.

## Dryer Cleaning

To clean ink and debris from the dryer, use a lint-free cloth dampened with water. Clean all external surfaces with the exception of the underside of the dryer.

## Reseat Connectors on Main PWA and Carriage Boards

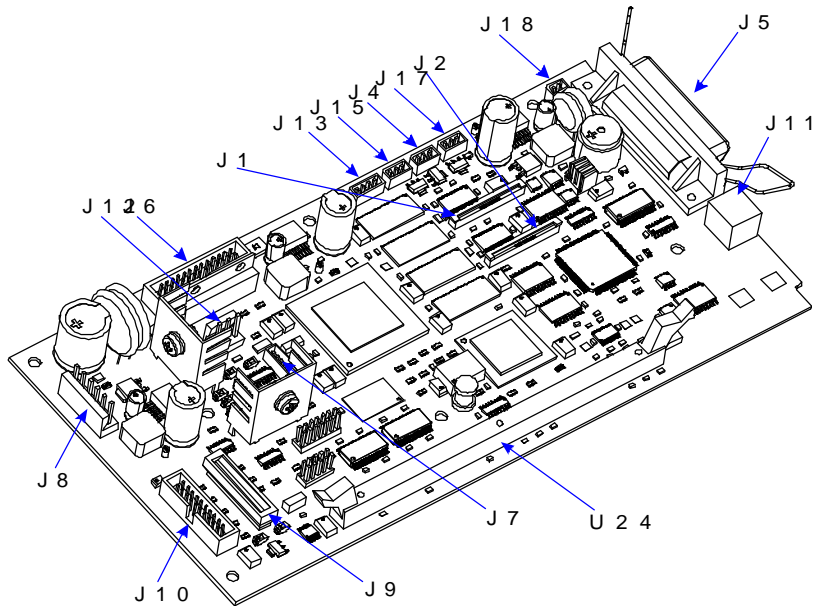
### CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

### CAUTION

Ribbon connectors can be easily damaged if incorrectly handled. Observe extreme caution when handling the ribbon connectors to avoid damage.

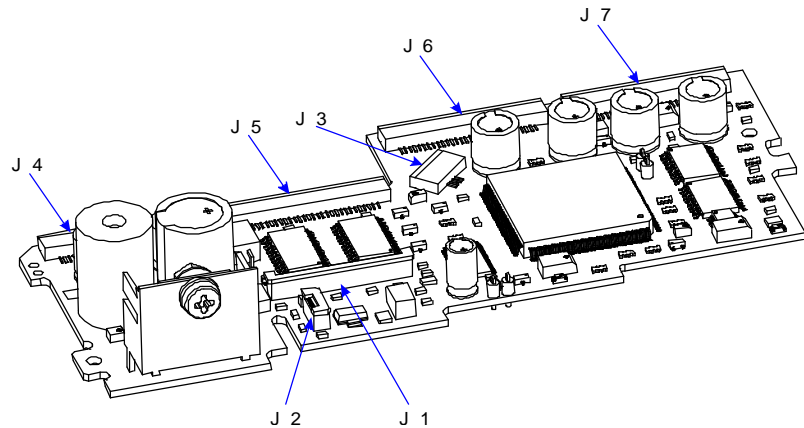
Many problems can be corrected simply by removing and reseating connections found in circuit assemblies. This process helps to clean the contacts and can dissipate any static electrical charges that might have developed.



**Figure 3-4. Main PWA Connection Locations.**

**Table 3-1. Main PWA Connections.**

J1	Trailing Cable A	J10	Display
J2	Trailing Cable B	J11	Serial Port
J3	not used	J12	Servo Motor
J4	Vacuum Fan #2	J13	AutoLoad Sensor
J5	Parallel Port	J14	not used
J6	Leg Harness	J15	Vacuum Fan #1
J7	Stepper Motor	J16	not used
J8	Power Supply	J17	Power Supply Cooling Fan
J9	Keypad	J18	E-Connect Power
U24	PC133 SDRAM DIMM socket		



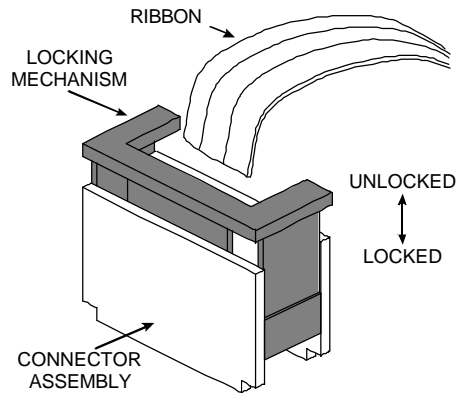
**Figure 3-5. Carriage PWA Connection Locations.**

**Table 3-2. Carriage PWA Connections.**

J1	Trailing Cable	J5	Cyan/Slot 2 Drivers
J2	Paper Sensor	J6	Magenta/Slot 3 Drivers
J3	Encoder Sensor	J7	Yellow/Slot 4 Drivers
J4	Black/Slot 1 Drivers		

Figures 3-4 and 3-5 show the locations of all the connectors on the Main PWA and carriage boards respectively. The J2 and J3 jack connections shown on Figure 3-5 are used on the right carriage assembly only.

To remove the ribbon cables from their connectors, lift the connector's ribbon locking mechanism as shown in Figure 3-6. To reattach, depress the locking mechanism back into the locking position after inserting the ribbon cable end.



**Figure 3-6. Ribbon Connector Locking Mechanism.**

## Replace Trailing Cables

### CAUTION

Before replacing the trailing cables from the printer always remove power from the printer.

The trailing cables (2 total) are rated for approximately 2000 hours of operational usage. Many factors including, but not limited to, hours/day used, cleanliness of the trailing cable surfaces and general ambient environment make it impossible to calculate the average time that the trailing cables will last. If the trailing cables are cleaned weekly the life of the cables should effectively double.

If not replaced, the wear on the trailing cable flexible printed circuits can result in erratic carriage motion and/or carriage axis failures, vertical white bands (jumps) in printed output, vertical color band jumps, and unrecognized cartridge error messages. Cables should always be replaced in sets (never replace one cable only).

To replace the trailing cables, follow the procedures for Trailing Cable Replacement found in Chapter 5.

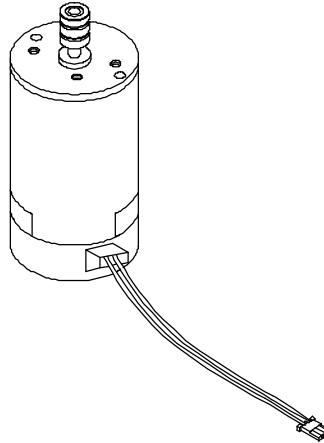
## **Replace Carriage Cover/Carriage Bushings**

The carriage cover bushings (2 total) are rated for approximately 2000 hours of operational usage while the carriage assembly bushings (4 total) are rated for approximately 4000 hours of operational usage. Many factors including, but not limited to, hours/day used, cleanliness of the slide shaft and general ambient environment make it impossible to calculate the average time that the carriage bushings to last.

If not replaced, the wear on the bushings can result in erratic carriage motion and/or carriage axis failures. It can even cause the cartridge head height to become uneven.

To replace the carriage bushings, follow the procedures for Carriage Cover Bushing and Carriage Bushing Replacement found in Chapter 5.

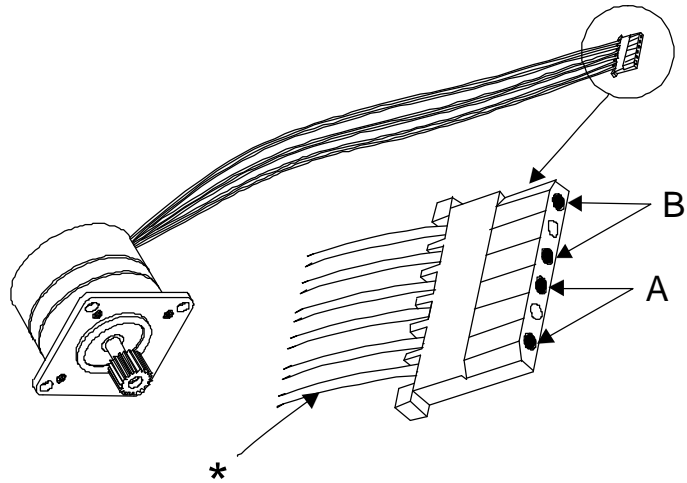
## Servo Motor Winding Resistance Check



**Figure 3-7. Servo Motor.**

1. Disconnect the servo motor connection from J12 on the Main PWA.
2. Using a standard ohmmeter or multimeter, connect the meter leads to the two wires going to the motor.
3. While manually rotating the servo motor, monitor the readings on the meter. The acceptable range is 2-12 ohms. Typically, the reading is 3-8 ohms.
4. If the measurement is found to be unsatisfactory, replace the servo motor.

## Stepper Motor Winding Resistance Check



**Figure 3-8. Stepper Motor.**

1. Disconnect the stepper motor connection from J7 on the Main PWA.
2. Using a standard ohmmeter or multimeter, measure between pins 1 (red wire) and 3. Point A in Figure 3-8. The asterisk in Figure 3-8 identifies the red wire.
3. The reading should indicate 7.2-8.0 ohms.
4. Continue by measuring between pins 4 and 6. Point B in Figure 3-8.
5. Reading should also indicate 7.2-8.0 ohms.
6. If either measurement is out of tolerance, replace the stepper motor.

## Power Feed and Take-Up Motor Winding Resistance Check



**Figure 3-9. Power Feed and Take-Up Motor.**

1. Remove the feed and/or take-up roll from the printer.
2. Using Phillips screwdriver, remove the four screws that secure the cradle idler from the right leg.
3. Ease the cradle idler off of the leg enough to disconnect the motor wires from the leg harness.
4. Using a standard ohmmeter or multimeter, measure between the + and - connections on the motor. While manually rotating the servo motor, monitor the readings on the meter. The acceptable range is 25-40 ohms. Typically, the reading is 29-36 ohms.
5. If the measurement is found to be unsatisfactory, replace the motor.
6. Perform the same procedure on the remaining motor.

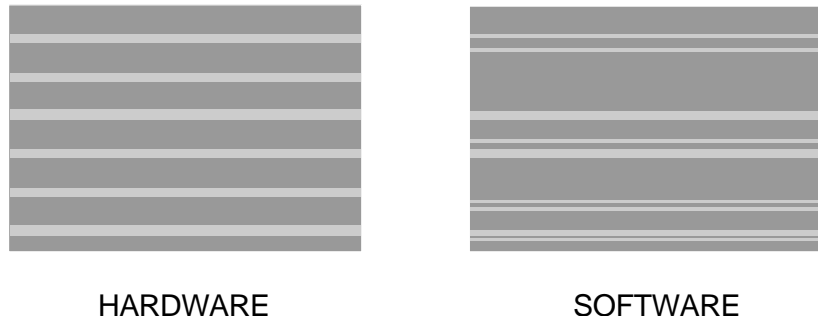
## Banding: Hardware vs Software

The technician must be able to identify whether the banding that is being observed is related to either a hardware or a software problem. The two examples in Figure 3-10 represent classic types of hardware and software banding errors.

## Banding Differences

Consistent horizontal banding is usually hardware related. Normally horizontal microbanding is caused by improper color deadband or color calibrations, dirty cartridges or service station. Inconsistent banding is usually software related. However, electrostatic discharge (ESD) from media (i.e. Backlit/Duratrans films) can also cause inconsistent horizontal banding. While minimal microbanding in an image typically occurs due to cartridge jet failures and clogs, dirty service station or an improper calibration of the printer, gross microbanding can be caused by a dirty encoder strip causing image skew or real hardware failures.

Vertical banding is always hardware related. Diagonal banding could be either hardware or software.



**Figure 3-10. Examples of Horizontal Banding.**

Hardware banding is usually characterized by consistent banding strips as shown. Typically horizontal banding is caused by the cartridge or print head in 95% of the cases. It signifies a slippage in the media's normal movement that is possibly due to the stepper motor, lower drive shaft assembly, pinch rollers, or the rollguides on the back of the printer. All these possible faulty areas deal with a rotational movement that, if faulty, will generate a consistent banding pattern. The Main PWA and Carriage PWA can also cause this type of error to occur.

Software banding is characterized by inconsistent banding lines or lines which violate the page layout (extend beyond the print border). These

banding lines are generated by the software when the application incorrectly interprets the media advancing/ink firing sequence of the expected print file or when text an error occurs within the host application. Errors can also be caused by insufficient host workstation or RIP memory or processing power. Because it is not directly tied to a mechanical movement, the bands become inconsistent in both frequency and duration. The possible causes are the printer driver, the original software package, or the RIP, if one is used. To eliminate the chance that it is the printer driver:

- 1) Remove any RIP or network systems and connect the printer directly to the computer via the printers parallel port.
- 2) Print a test file approved by **ENCAD** that uses only the ENCAD print file utility version 3.0 (EFPU 3.0) and the **ENCAD** printer. Send a test file via LPT1 with ECP mode enabled with DMA channel assignment.

If the test file prints correctly, the problem lies in either the software package that generated the print or the RIP, if used. The problem could also be with the built-in E-Connect print server or with the workstation transmitting the print data directly to the printer's parallel port. To eliminate the E-Connect print the Semi-Circular Nook test pattern by quickly depressing the TEST button at right rear of printer (Ensure the short (15"/39 cm) parallel printer cable is attached between parallel ports prior to activating the test.

A simple test to determine if the banding is caused by the computer/RIP/application or the printer is to rotate the image 90 degrees and see if the banding rotates or remains in the same orientation as the previous print. If the banding does not rotate, then look for causes in the printer. If the banding does rotate with the image, then look for causes in the computer/RIP or application.

## Banding Causes & Quick Analysis

### Horizontal Banding Problems

1. Check the print mode for the type of image being printed. Refer to Printer Calibrations - 'Checking Print Mode'. Is the high pass mode (5 pass for 2x4 configuration, 10 pass for 1x4, 1x6, and 1x8 cartridge set configurations) printing successful? Note: 3 pass mode (2x4 configuration) or 4 pass mode (1x4, 1x6, and 1x8 cartridge set configurations) will microband in many of the 2 tone color ranges including some blue, gray, orange, and purple hues. Check to see if the media is loaded correctly and is of proper thickness (no greater than 20 mil media can pass through the machine). Check to see if the media guides are in place and are not defective. Check the pinch rollers for alignment/damage.
2. Are the color deadband and color calibrations correct? Refer to Printer Calibrations. Inspect the Prime pattern and verify diagonal line in the jet test is consistent throughout. The line should not have sections or lighter and darker shades, it should not be dissolved or broken. Refer to Printer Features - 'Jet Out Detection'. Clean, manually bypass clogged jets, or replace the cartridge if any of these abnormal conditions exist. Defective or clogged cartridges account for 90% of the banding observed.
3. Change the preheat setting for the affected color. To gain access select SetUp Menu, Ink Option Menu, Ink PreHeat Settings, choose the appropriate color. If this does not help, then return settings to zero (0) default at completion of test.
4. Ensure the Auto-Wipe feature is turned off. To gain access select SetUp Menu, Paper Option Menu, Auto-Wipe, select off. Auto-Wipe of the carriage head (occurs every 2 minutes when activated) can cause a dry band to appear on the print. This feature is normally defaulted off. The printer will normally spit into the service station every 15 seconds (GO or GX ink loaded) or every 2 minutes (GS+ ink loaded) to keep nozzles clear but will not interfere with print and dry time to cause banding of any nature.

5. Clean the cartridge electrical and carriage flex driver cable contacts with isopropyl alcohol. Refer to Scheduled Maintenance. Reseat the flex driver cable connection for print images which contain vertical bar patterns along the right edge of print. If more than one color (represented by the vertical bars) is present then the trailing cable is either unseated or defective.
6. Clean the encoder strip (top and bottom) and inside of carriage belt with distilled water. Clean the slide shaft with isopropyl alcohol.
7. Change media to see if electrostatic discharge from media is causing the banding to occur. Add 3rd party protection if required.
8. Ensure vacuum fan is providing adequate suction for media. It is possible that binding of the feed roller may also occur (leading to microbanding and abnormal print anomalies) if the stand legs are not secured to the printer head securely. A rocking motion (from the weight of the carriage assembly movement during printing) is created which can cause shifting of the printer base.
9. Turn printer off. Slowly move carriage head back and forth manually to ensure no obstructions are causing the print defects observed (i.e. tape on the rear cover, tie-straps under the electronics cover, or low carriage head height).
10. Check E-Connect Print Server. Carriage head hesitation (which causes microbanding) is normally caused by a low data port rate (information cannot get through the print server fast enough). While the E-Connect is rated for 700 kilo bytes per second (fast enough to handle any large format demands at the fastest printer speed available), an improperly configured server or a server in a high traffic environment may be the cause of the microbanding. Test printer with limited or no network traffic to verify. Reconfigure the E-Connect if necessary and turn off any redundant or unused protocols. Please consult a network administrator for assistance.
11. Print a test RTL file to verify banding, if banding is absent, then check software. Obtain the Demo Images CD and refer to the Multimedia Operations CD - 'Demonstration Print' for proper procedure. Print at least 50% of the test print (1/2 meter long) before deciding the next course of action. The Test Print (Utility

Menu, Service Menu, Test Print) may be used, but this test is a compressed vector based file and may exhibit certain dithering properties different from that of another rasterized print.

12. Refer to 'Cartridge Misfires' and 'Ink Dropout' to ensure all other troubleshooting checks have been made.
13. For single color or multiple color print failures replace the carriage PWA. If normal test patterns (i.e. Color Test and normal basic test patterns) are seriously degraded then replace the carriage PWA. Refer to Disassembly.
14. Inspect and clean stepper motor and lower roller drive gears if printer is older than 5 years. Other unique causes include synchronization errors from the stepper drive system due to defects or gear cleanliness.
15. Replace stepper motor for consistently spaced horizontal patterns (2 - 10 mm apart) when printer is run in the best mode with a test print. Often a lower roller drive noise will accompany the banding. Inspect stepper motor gearing/lower roller for damage/debris (ensure screws are tight).  
Check stepper motor winding resistance.
16. Check lower roller height for head scrapes on media. Banding will have jagged or slightly angled lines at the termination points or may even appear as light cuts in the media (like a utility knife cut the surface of a print). The normal head height range between the bottom surface of the cartridges and the platen surface is 0.062" to 0.068". Use the Carriage Head Height Kit for proper adjustment. Refer to Alignments.
17. Replace the servo motor for horizontal bands (thicker than 2 mm) which extend beyond the page layout from .5 mm to 20 mm. The servo motor bearings may be faulty; normal servo motor life is 1600 to 2500 plot hours. Horizontal bands (0.2 mm to 1 mm) which extend beyond the page layout are usually caused by the workstation memory or the driver not having sufficient work space. Ensure 1GB is free on hard drive at all times; 256 MB of memory is suggested. Partitioning the hard drive is recommended. Refer to Disassembly.

18. Clean or replace encoder strip for image skewing (image walking or skipping). Whether the image skews slightly or off the page the encoder strip is at fault. Typically characterized as horizontal banding, often a walking image can also create vertical bands to appear in the print. Refer to 'Scheduled Maintenance' for cleaning or 'Disassembly' for encoder strip replacement.
19. Improper grounding or earthing. An improper A/C outlet power ground may cause banding due to excessive noise on the line between the neutral and ground. Ensure the outlet has a clean zero ground potential with minimal noise between the neutral and ground.
20. Replace Main PWA for severe horizontal and vertical banding patterns. Refer to Disassembly.

## **Vertical Banding Problems**

1. For vertical banding check carriage bushings for wear and ensure the bushings are free of dirt and ink residue buildup. Perform the carriage vibration test under 'Diagnostics' Menu, the lines should print fine with no jagged edges. Clean the bushings with a dry lint-free towel if necessary. Replace both carriage bushings. Refer to Disassembly.
2. Rotate image in software 90 degrees and/or print a test RTL file to verify banding. Obtain the Sample Images CD and refer to 'Demonstration Print' for proper procedures.
3. Replace the trailing cable prior to any circuit assembly replacement. Replace trailing cable for vertical jumps in color (i.e. one color does not print through one part of the print, the image appears to have a vertical pattern) or for vertical white spaces down a print. Replace the trailing cable if multiple sets of vertical bars appear along the right edge of the print, usually containing CMYK colors. The image may also be 'pushed' slightly to the left side of the printing area. Refer to Disassembly.
4. Clean or replace encoder strip for image skewing (image walking or skipping). Typically characterized as horizontal banding, often a walking image can also

create vertical bands to appear in the print. Refer to 'Scheduled Maintenance' for cleaning or 'Disassembly' for encoder strip replacement.

### **Line Quality Problems (Overspray)**

1. Check the print mode, normally quality is achieved in the draft, normal or best mode. The Super Draft mode is 600 x 300, not 600 x 600 like the other modes. Are any compression utilities being used? Avoid embedding text onto a layer that is compressed, this is known to cause apparent overspray like symptoms when printed.
2. Are the color deadband and color calibrations correct? Refer to Printer Calibrations.
3. Check the ink cartridge jet plate for buildup and ink residue. Refer to Scheduled Maintenance.
4. Clean the encoder strip (top and bottom), slide shaft and inside of carriage belt with isopropyl alcohol. Refer to Scheduled Maintenance.
5. Check carriage cover bushings (2 bushings) for wear and for cleanliness. Refer to Scheduled Maintenance. Check carriage bushings (4 inner bushings) for wear. Refer to Disassembly.
6. Ensure vacuum fan is providing adequate suction for media. Head strike is a leading cause of inconsistent horizontal banding and reported poor line quality. The carriage bushings may need replacement if worn out (thus a lower carriage head height).
7. Change media to see if electrostatic discharge from media is causing the banding to occur. Add 3rd party protection if required; a static eliminator strip with carbon fibers running the length of the strip may be necessary to dissipate discharge values in excess of 25KV. If 3rd party protection is added to the printer ensure the strip is grounded to the Main PWA ground properly.
8. Perform the carriage vibration test under 'Diagnostics' Menu, the lines should print fine lines with no jagged edges.
9. Print a test plot off the Demo Images CD. If no overspray or similar problems show, then check the software driver or original file. Draw a simple box and send to print from application; default line thickness should be 0.008" (AutoCAD). Check printed output for correct line thickness. Obtain the Demo

Images CD and refer to 'Demonstration Print' for proper procedures.

## Alignments/Adjustments

The **ENCAD NovaJet 850** printers are designed with a minimum of maintenance requirements in mind. Calibrations include: color calibration, deadband alignment, and X-axis calibration. The mechanical adjustment requirements include the slide shaft profile and cartridge head height adjustments. They do not require any electrical alignments.

### Slide Shaft Profile Adjustment

The **NovaJet 850** printers Slide Shaft height is factory set and is firmly mounted on the outer sides and only has adjustments in the middle portion of the shaft, to remove any bowing of the shaft's profile. The following procedure is to ensure that the Slide Shaft is relatively perpendicular to the surface of the Platen and to remove any bowing that may be present in the shaft's profile.

The Slide Shaft is set to 1.418" (36cm) from the top of the Slide Shaft to the Platen surface for the **NovaJet 850** printer. The normal operating range for the height of the Slide Shaft is between 1.390" (35.3cm) to 1.440" (36.6cm).

You will need the following:

- Height Gauge Kit Assembly (P/N 209996)
- 1/4" open and box end wrench (.110" thick)
- Head Height Alignment Plate (provided with the NJ850 Service Training Kit or in the Service CE Kit)

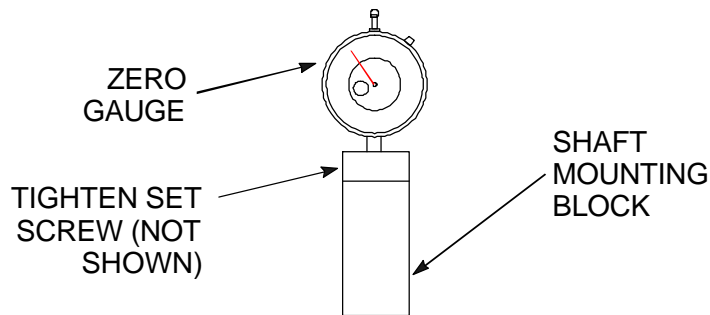
Height Gauge (Alignment) Kit Contents are:

Dial Gauge Micrometer  
Modified Novajet Cartridge for newer products  
Modified Novajet 4/Pro/Pro 50 Cartridge - Not Used  
Platen/Carriage Shaft Mounting Block

Calibration Jo Block (1.434")	- Not used
Plastic Gauge Card (0.011")	- Not used

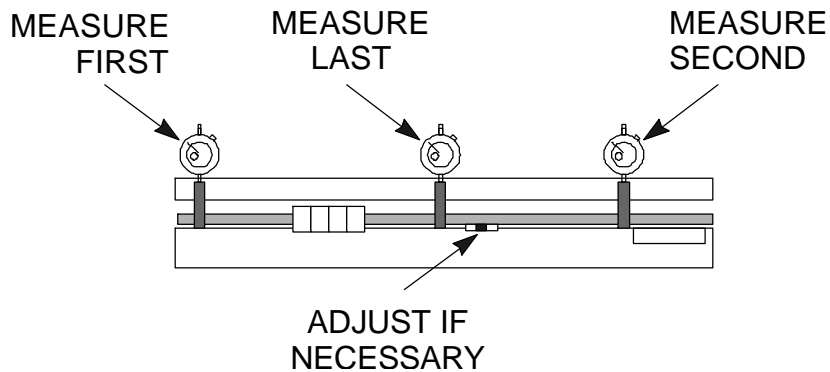
There are two basic measurements that are to be made using this kit (ensure power is off prior to performing these procedures):

1. Slide Shaft Profile Adjustment
  2. Carriage (Cartridge) Head Height Setting
1. Connect the dial gauge micrometer to the Shaft mounting block as shown in Figure 3-11.



**Figure 3-11. Dial Gauge Micrometer Assembly.**

2. Place gauge against left side of shaft assembly allowing micrometer tip to rest directly on top of shaft. See Figure 3-12. **Zero the gauge** (this is to become the reference point).

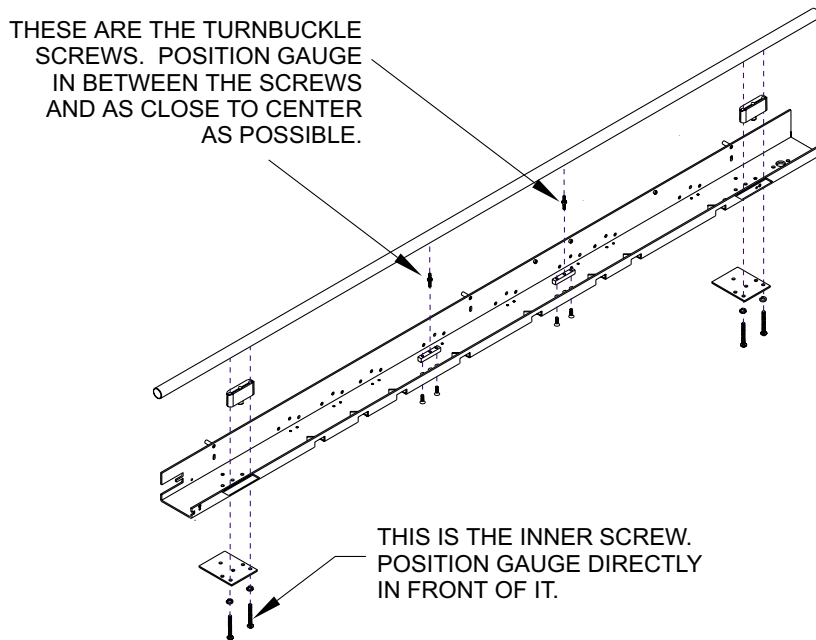


**Figure 3-12. Measurement Positions for Slide Shaft.**

3. Measure the right side (next to media alignment mark) and note the difference. Divide this amount by two.
4. Measure just off the center of the slide shaft and adjust the center turnbuckle with an open ended wrench if required, for the average value (the value found in step 3.) See Figure 3-13.

## **NOTE**

The **NovaJet 850** 60 inch model has two turnbuckles, so both of these need to be adjusted together for the center position.



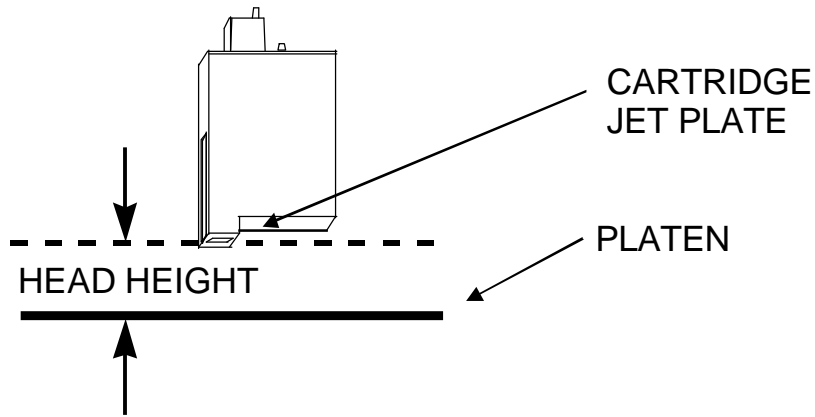
**Figure 3-13. Slide Shaft Profile Adjustment.**

For example: If the Left = 0, Right = +0.004", then the center should be adjusted to + 0.002". This will ensure a smooth plane of travel for the carriage assembly. There are no adjustments on either end of the shaft in all models.

## Head Height Alignment Procedure

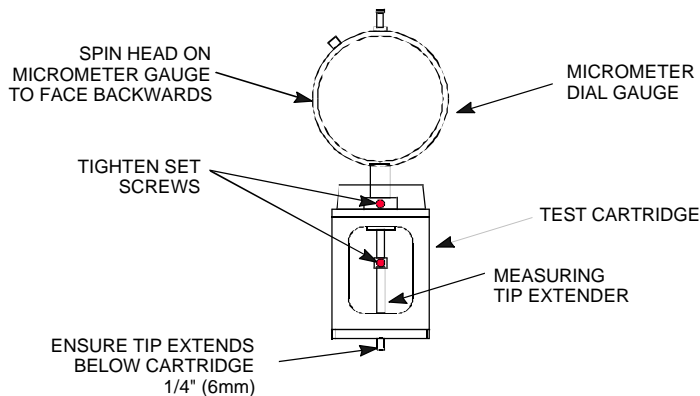
Perform this procedure only when the encoder strip stabilizer has been removed from the Y-Arm or whenever the alignment is in question (carriage head strikes occur or deadband calibrations cannot be achieved).

The head height alignment procedure is to ensure that the correct amount of distance exists between the cartridge jet plate and the Platen. See Figure 3-14.



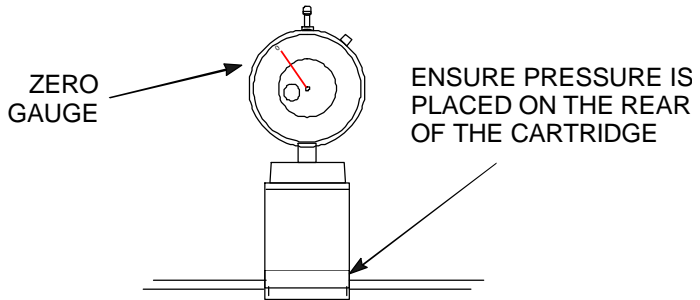
**Figure 3-14. Carriage Head Height Tolerance.**

1. Remove the lid and the right cover of the printer. See Chapter 5 for procedures.
2. Obtain the 3 tools (Micrometer Dial Gauge, Test Cartridge, and Measuring Tip Extender) from the Height Gauge Kit. Obtain the Head Height Alignment Plate. Assemble the tools as shown in Figure 3-15.



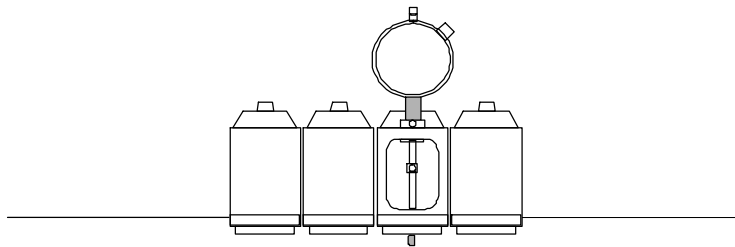
**Figure 3-15. Setting Up Tools from Height Gauge Kit.**

3. Place the test cartridge upright on a flat surface and 'zero' the gauge by loosening the knob near the top and turning the dial until the needle is at the '0' position on the dial. Tighten the knob. See Figure 3-16.



**Figure 3-16. Zeroing the Micrometer Gauge.**

4. Remove the Cyan ink cartridge. Snap the test cartridge with the micrometer gauge into the position vacated by the Cyan ink cartridge. See Figure 3-17. Ensure that the micrometer can be read from the BACK of the printer.



**Figure 3-17. Test Cartridge Installed.**

5. Slightly loosen the 6 screws located on the back of the Y-arm that secures the stabilizer to the Y-arm.

**CAUTION**

Damage may occur to the micrometer gauge if the Carriage is moved without lifting up on the measuring tip. This action could also take the micrometer out of alignment and foul the results of the alignment.

6. While lifting up the measuring tip of the micrometer, slide the Carriage to the left side of the stabilizer. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.
7. Move the left end of the stabilizer bracket until the reading below is observed. Read only the **RED** numbers on the micrometer gauge.

For the **NovaJet 850** printer adjust for a reading of 67 +/- 3. This equates to a head height of 0.065".

**NOTE**

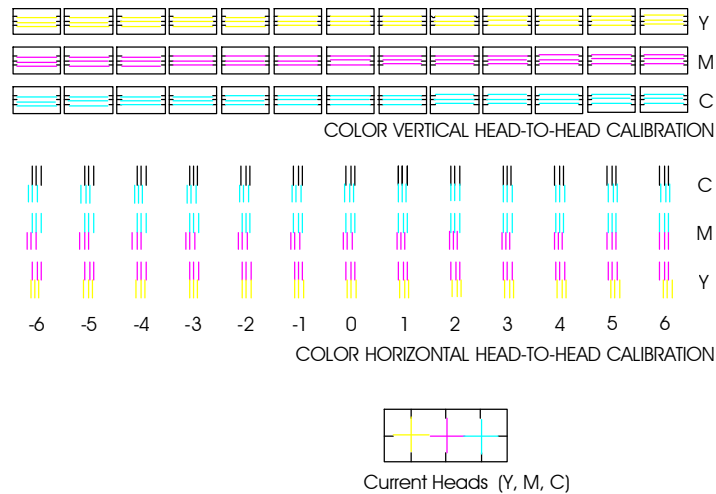
The actual measurement is different than the true head height due to the fact that the test cartridge does not contain a jet plate assembly. A difference had to be calculated to compensate for the lack of a jet plate assembly on the test cartridge.

8. Tighten the screw on the left side of the stabilizer.
9. While lifting up the measuring tip of the micrometer, slide the Carriage to the right until the next stabilizer screw is lined up. Position it as close to the screw as possible and drop the measuring tip onto the platen. Do this a couple of times to ensure an accurate reading.
10. Move the left end of the stabilizer bracket until a correct reading is observed. Read only the RED numbers on the micrometer gauge.
11. Tighten the screw on the stabilizer that is next to the Carriage.

12. To adjust the far right screw obtain the head height plate and install into the service station access hole (service station must be removed). Move the carriage assembly over the service station access hole so the Micrometer measuring tip extends to the head height plate surface. Adjust for 67 +/-3 reading the RED number only.
13. Continue performing steps 10 through 12 until all six of the stabilizer screws have been adjusted.
14. Reposition the Carriage to all of the adjustment positions and verify that the measurements are correct.
15. Perform steps 6 through 15 as many times as necessary to correctly accomplish this adjustment.

## **Color Calibration**

This procedure describes how to check that the cartridges are properly aligned for color plotting and should be followed each time the ink cartridges are installed. Figure 3-18 is a representation of how a color calibration looks when printed.



**Figure 3-18. Vert. and Horiz. Color Calibration.**

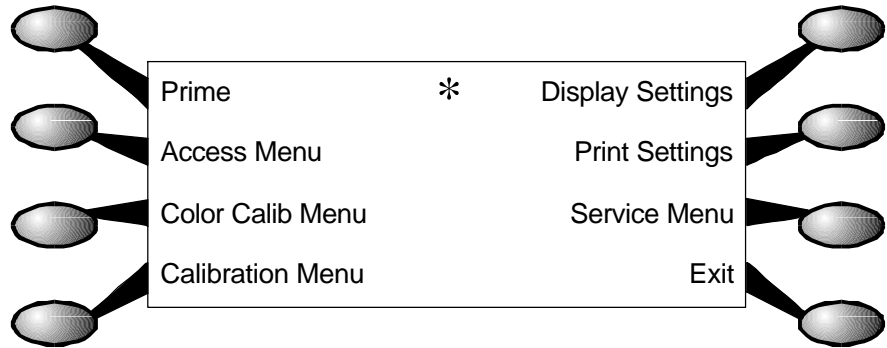
The “Current Heads (Y, M, C, 1, 2, 3, 4)” view represents the alignment of the heads as they are currently entered. This is just an overview of all heads and how they are aligned. Do not attempt to align the heads using this view.

The “Color Horizontal Head-to-Head Calibration” checks the alignment of the nozzles horizontally and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the K (black) C (cyan), M (magenta), Y (yellow), 1, 2, 3, and 4 (1-4 are assigned colors) on the right side of the plot.

The “Color Vertical Head-to-Head Calibration” checks the alignment of the nozzles vertically and allows corrections when required. Just enter the value below the set of lines that are correctly aligned. Be careful that you are aligning the correct color by observing the K (black), C (cyan), M (magenta), Y (yellow), 1, 2, 3, and 4 (1-4 are assigned colors) on the right side of the plot.

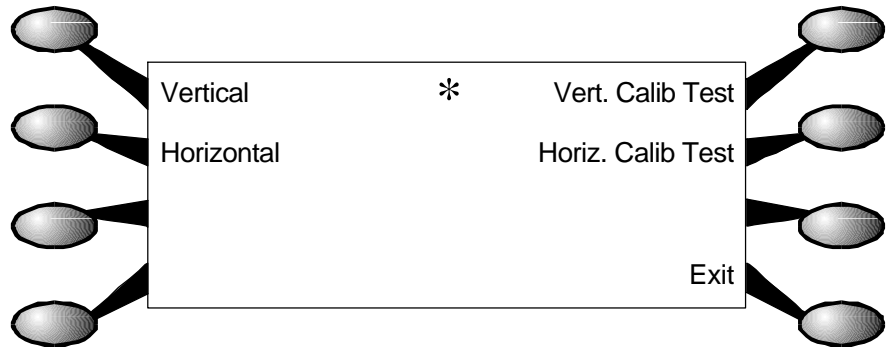
#### **To perform the Color Calibration:**

1. Select “Utility Menu” from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.



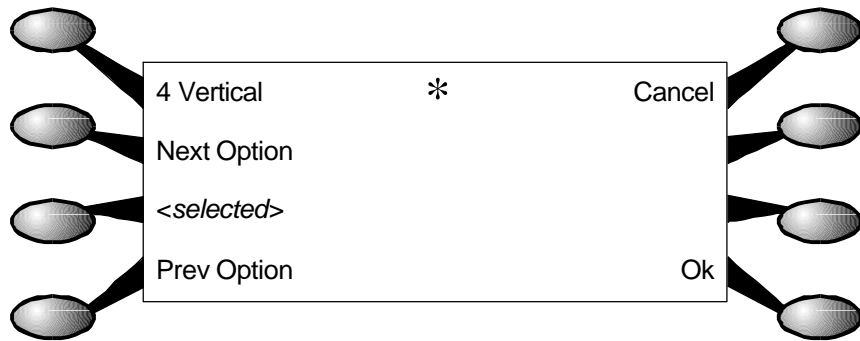
**Figure 3-19. Utility Menu.**

2. From the Utility Menu, select "Color Calib Menu". This brings up the color calibration menu and it looks like Figure 3-20.



**Figure 3-20. Color Calib Menu.**

3. Select "Vert. Calib Test" to print the vertical color calibration plot as shown in the upper half of Figure 3-18.
4. When the plot is complete, select "Vertical" at the Color Calib Menu, then select "4 Vertical". This brings up the options menu as shown in Figure 3-21 to perform the vertical adjustment on the cartridge located in slot 4.



**Figure 3-21. 4 Vertical Options Menu.**

5. Observe the plot and using either “Prev Option” or “Next Option”, rotate through the selections until the one that best aligns the cartridge in slot 4 on the plot is selected. Press “Ok” to accept the selection and return to the Color Calib Menu.
6. Continue until all seven vertical calibrations on the Color Calib Menu have been accomplished.
7. To make adjustments to the horizontal alignments, follow similar procedures as those above but replace “vertical” with “horizontal”. The Horizontal Color Calibration printout is shown on the lower half of Figure 3-18.

## Deadband Alignments

Deadband calibration compensates for minute differences created when bidirectional printing is used. Unidirectional printing is not affected by deadband. There are four types of deadband tests:

- Deadband
- Slow Deadband
- All Lines Tests
- Single Line Test



**Figure 3-22. Slow Deadband.**

Figure 3-22 shows what the display will look like when printing the slow deadband test if it is out of alignment. A correctly aligned printer will appear as if there is only a series of vertical lines printed. No difference between the top and bottom set of lines to the center set of lines would be apparent.

The SLOW DEADBAND calibration is a precision test that checks the firing time of the jets as related to the forward and reverse direction.

Allowable values for the Slow Deadband calibration is -2, -1, 0, 1 and 2.

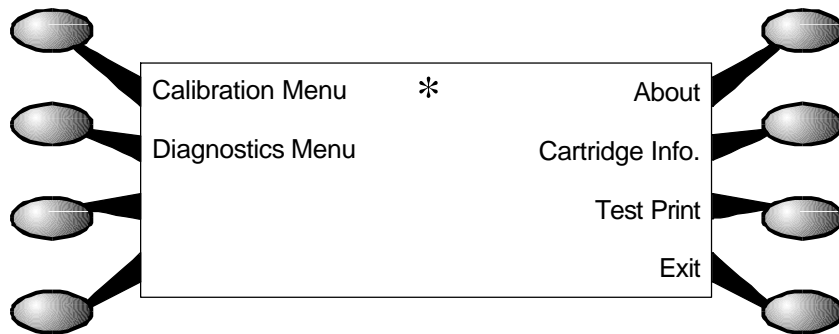
The Single Line Test and All Line Test are variations of the deadband test except they print longer lines so that long time integration of the deadband calibration can be observed. The Single Line Test prints only one line at a time while the All Line Test prints all lines at the same time. These tests were designed primarily to be used in manufacturing only.

The deadband test on a **NovaJet 850** will print a display similiar to Figure 3-22 but will print the pattern for each of the eight cartridges. This is just a visual check of the color deadband alignment. No adjustments can be made for this test at this control panel page. To make adjustments, if needed, see the Color Deadband Alignment section.

Allowable values for the Color Deadband Alignments on this printer is from 0 to 120 but the actual value used by the printer will only accept certain numbers. The real value used by the printer will be the closest of 12, 20, 28, 36, 44, 52, 60, 68, 76, 84, 92 or 100.

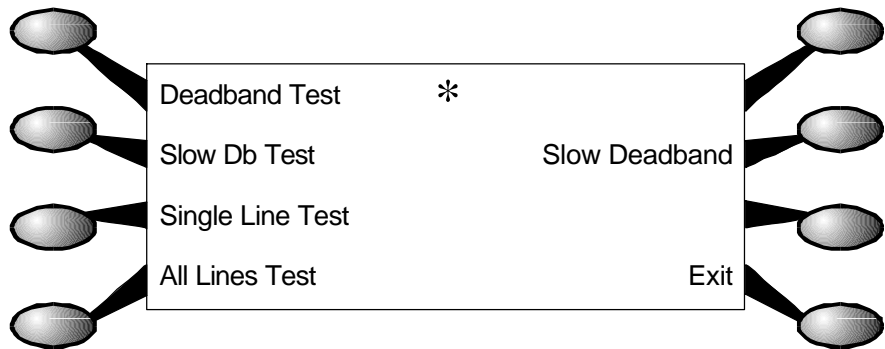
**To perform the Slow Deadband Alignment:**

1. Select "Utility Menu" from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.
2. Select the "Service Menu" from the Utility Menu. This brings up the Service Menu as shown in Figure 3-23.



**Figure 3-23. Service Menu.**

3. Select the “Calibration Menu” from the Service Menu.
4. The Calibration Menu shown in Figure 3-24 is where the deadband tests are performed. Select “Slow Db Test” to run the slow deadband test.



**Figure 3-24. Calibration (Deadband) Menu.**

5. When the plot is complete, select “Slow Deadband” at the Calibration Menu. This brings up the options menu for the slow deadband adjustment. This menu is similar to the menu depicted in Figure 3-21.
6. Observe the plot and using either “Prev Option” or “Next Option”, rotate through the selections until the value you want is selected. Press “Ok” to accept the selection and return to the Calibration Menu.

7. Continue performing steps 4 through 6 until the slow deadband adjustment is correct.

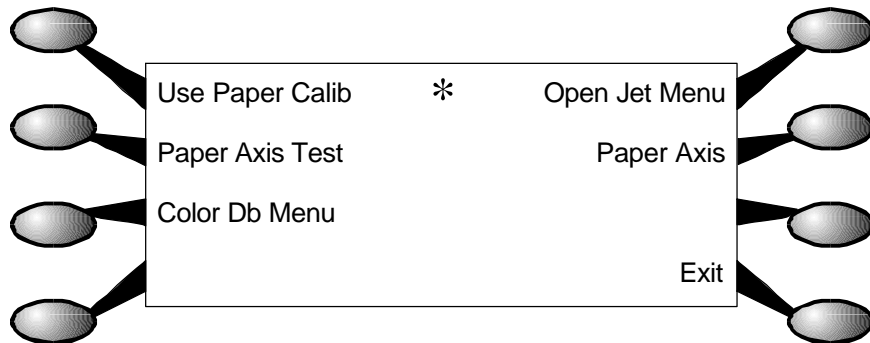
## Color Deadband Alignment

The color deadband alignments are necessary to ensure that the output images are being produced with the highest quality standards available while using the *ENCAD* printer in a bidirectional mode.

These adjustments help to compensate for any deviations that may have become apparent due to the carriage speed and/or the type of media loaded. Precise calculations are being performed to time the release of the ink drop so that they land on the media at the correct location. Differences in media thickness make the distance that the ink has to fall vary and this variable needs to be compensated for in the calculations.

### To perform the Color Deadband Alignments:

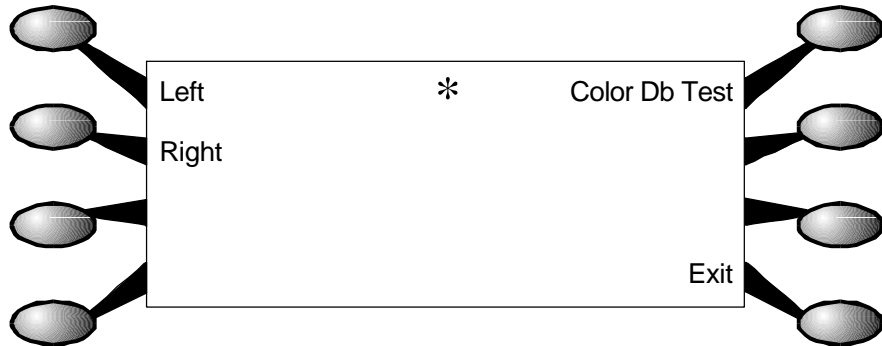
1. Select "Utility Menu" from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.
2. Select the "Calibration Menu" from the Utility Menu. This brings up the Calibration Menu as shown in Figure 3-25.



**Figure 3-25. Calibration Menu.**

3. Select the "Color Db Menu" from the Calibration Menu.

4. The Color Db Menu is shown in Figure 3-26 and is where the color deadband test is performed.



**Figure 3-26. Color Db Menu.**

Select "Color Db Test" to run the color deadband test.

The test consists of 12 default calibration settings. When the test is run it will print out a pattern of 5 calibration lines for each of the 12 settings. It will print this pattern for K, 1, C, 2, M, 3, Y, 4. Also printed will be the current settings for each of the four, six, or eight cartridges as well as the slow deadband setting.

5. When the plot is complete, select "Left" at the Color Db Menu, then "4 Deadband". This brings up the options menu as shown in Figure 3-21 to perform the deadband adjustment on the cartridge located in slot 4. This menu is similar to the menu depicted in Figure 3-21.

## **NOTE**

The only acceptable values for the color deadband adjustments are 12, 20, 28, 36, 44, 52, 60, 68, 76, 84, 92 and 100. Any other value entered will appear to be accepted because it will be displayed in the current settings section the next time this test is run. In actuality, the system will default to the closest allowable setting as listed above.

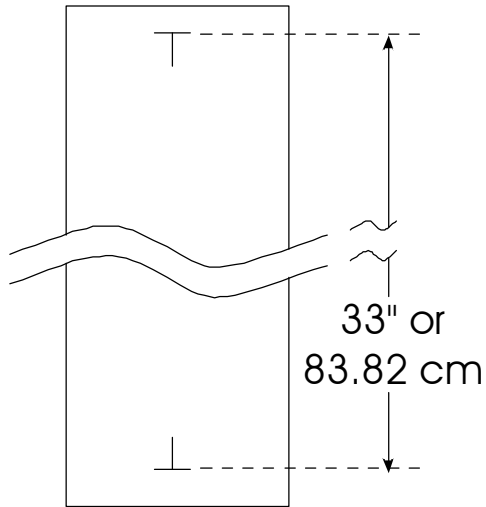
6. Observe the plot and using either "Prev Option" or "Next Option", rotate through the selections until one that seems closer to the correct value is selected. Press "Ok" to accept the selection and return to the Left Carriage Cartridge Slot Selection Menu.
7. Continue performing steps 4 through 6 until the all color deadband adjustments are correct on the left carriage.
8. To make adjustments to the right carriage deadband alignments, follow similar procedures as those above but replace "left" with "right".

## **Paper Axis Calibration**

The paper axis calibration procedure ensures that the processing that drives the stepper motor is correct to minimize line length accuracy errors.

### **To perform the paper axis procedure:**

1. Select "Utility Menu" from the Main Menu. This brings up the Utility Menu as shown in Figure 3-19.
2. From the Utility Menu, select "Calibration Menu". This brings up the Calibration Menu as shown in Figure 3-25.
3. From the Calibration Menu, select "Use Paper Calib." Ensure that Use Paper Calib is set to ON and press "Ok." This allows the printer to store the data that is entered in step 7.
4. From the Calibration Menu, select "Paper Axis Test". This runs the paper axis test which prints out two "T" figures that are mirrored from each other and about 33" (83.82 cm) apart. See Figure 3-27.

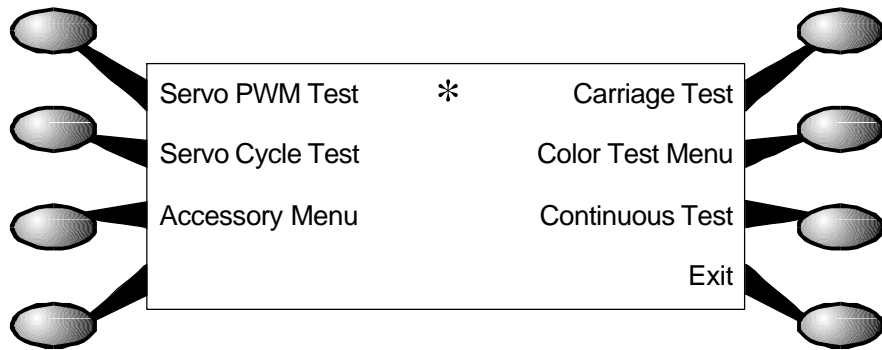


**Figure 3-27. Paper Axis Test.**

5. With a precision drafters measuring stick, measure the exact distance from each of the “T” intersections.
6. Select “Paper Axis” at the Calibration Menu. This brings up the options menu for the paper axis adjustment. This menu is similar to the menu depicted in Figure 3-21.
7. Using either “Prev Option” or “Next Option”, rotate through the selections until the exact value of the measurement found in step 5 is selected. Press “Ok” to accept the selection and return to the Calibration Menu.

## Diagnostics Menu

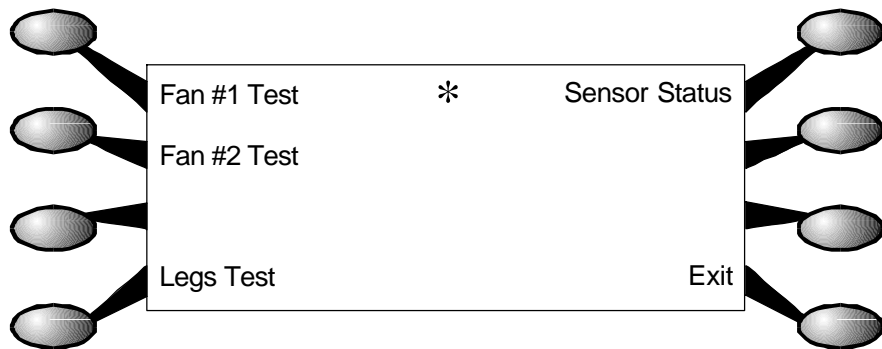
The Diagnostics Menu is located in the Service Menu (shown in Figure 3-23) and is seen in Figure 3-28.



**Figure 3-28. Diagnostics Menu.**

All tests under the Diagnostics Menu should be performed by competent technicians only. The types of tests that can be performed are: Servo PWM Test, Servo Cycle Test, Carriage Test, Color Test, Continuous Test, Fan #1 Test, Fan #2 Test and Legs Test.

The Fan #1 Test, Fan #2 Test and Legs Test are located in the Accessory Menu as shown in Figure 3-29. A Sensor Status Menu is also available in the Accessory Menu.



**Figure 3-29. Accessory Menu.**

**Servo PWM Test** - Monitors the PWM (pulse width modulation) signal applied to the servo motor from the driver on the Main PWA to check the amount of force required to move the Carriage. The test performs three complete cycles of the carriage assembly and lists the average PWM via a Halt Time count. If Halt Time reaches 98 then a 'Carriage Axis Error' will result. When Halt Time exceeds 90 during normal operations routine or corrective maintenance is required.

Servo Cycle Test - Tests the servo motor by moving the carriage back and forth across the slide shaft. The number of cycles is selectable and the available options are:

10  
100  
1,000  
10,000  
100,000  
1,000,000.

Carriage Test - Prints 5 sets of 3 parallel lines to test the vibration characteristics of the carriage assembly.

Color Test - The Color Test prints a wide swath of ink for the slot selected to test for banding and ink delivery system pressure. The test is selectable in the density of ink that is to be printed. The available are: 10%, 25%, 35%, 50%, 65%, 75%, and 100%.

Continuous Test - The Continuous Test sends the printer into a test loop that will perform a series of tests continuously. Powering down and restarting the printer or selecting RESET is will exit this test loop.

The Continuous Test will first prime the cartridges, followed by a serial port test, parallel port test, a fast deadband display and a color calibration display.

The deadband and color calibration displays are used only as a visual inspection of the operating condition of the printer. No adjustments can be performed while in the Continuous Test mode.

A loopback test cable is required to correctly accomplish the serial and parallel port tests. This part of the test is not necessary to perform because the serial port is not used and the parallel port can be tested using the E-Connect TEST button. The TEST button on the E-Connect assembly on the rear of the printer when depressed quickly causes a Semi-Circular Nook Test pattern to be printed. This will effectively test the parallel ports (E-Connect and Main PWA parallel port).

After completing the deadband display, the test will begin again with the prime and continue until power is removed.

Fan #1 and Fan #2 Tests - Tests the operation of the fans on the printer. Fan #1 Test (while depressed) turns on the power supply cooling fan and the suction fan inside the platen on the right side of the printer. Fan #2 Test (while depressed) turns on the suction fan inside the platen near the center of the printer. The 42 inch printer does not have this second suction fan, therefore, the Fan #2 Test is disabled.

Legs Test - Tests the condition of the leg harness connections and the components of the power feed and take-up system and dryer assembly.

## Firmware Download/Upgrading for the PC

You can download new firmware from Encad's website, [www.encad.com](http://www.encad.com). The normal method of downloading new firmware sends the file to the printer as a standard print job. Downloading new firmware is a simple procedure. You will need the firmware, *nnnnxxx.rom*, and the Encad File Print Utility (EFPU) to download the code. ('nnnn' identifies the product and 'xxx' is the version number of the firmware.) The EFPU can be found on the CD that shipped with your printer or you can download the utility from Encad's website.

Note: Firmware cannot be downloaded through a RIP, unless the RIP has a 'pass-through' feature.

### To download new firmware to your printer.

1. If you already have a network connection to your printer, you can use that to download the firmware or connect an IEEE1284 compliant parallel printer cable between the printer and computer.
2. Open the EFPU and press the **Add** button in the Folders section of the dialog box. Give the new folder a name and press **OK**.
3. Press the **Add** button in the Files section of the dialog box. Find the firmware file that you downloaded from Encad's website and press the **Open** button. This will add the firmware file to the folder you created.

4. Select the firmware file in the Files section of the dialog box and press the **Print** button.

The firmware file is sent to the printer as a normal print job. Approximately 20 - 40 seconds later a single beep should be heard indicating the update was successful. After a one second delay, the printer will automatically reboot. The printer should come up normally. Verify the new firmware revision by sequencing through Utility Menu/Service Menu/About Menu. If multiple beeps are heard, reboot printer and reseal your connection to the printer (network cable or parallel cable). Resend the firmware file to the printer.

## Firmware Download/Upgrading for the MAC

The normal method of downloading new firmware is to send the file as if it was a standard print job.

1. Power OFF printer, wait 15 seconds.
2. Connect an Image Writer II cable between the printer and MAC.
3. Turn the printer ON.
4. Obtain the latest firmware revision from the ENCAD web site, unpack the file and launch the EFPU. File names may be different from that listed below.

Click on "File"

Click on "Preferences"

Select the appropriate port that your printer is connected to (either Modem or Printer.)

Drag and Drop the **XXXX.ROM** file (or the latest version) into the "Spool Folder".

Wait approximately 20 to 40 seconds later until you hear a SINGLE beep, indicating the download was successful. You may encounter a set of double beeps shortly after sending the firmware file, but you must wait until you hear the SINGLE beep.

5. After hearing the single beep, remove power from printer for 15-20 seconds. Apply power to the printer. The printer should initialize properly. Verify firmware revision by sequencing through **Utility Menu - Service Menu - About** menu. Verify firmware has been incorporated.

If the firmware download is not successful you may hear more than 1 beep or complete silence. Check port connections and return to step 4.

## Internal Cabling and Signal Flow Diagrams

Figures 3-30 through 3-32 are schematics of the major components and the cabling associated between them. The diagrams depicts component boards or assemblies, jack connections, cables, and signal flow. It is to be used by the technician as an additional aid in troubleshooting and improve understanding of the printers theory of operation.

Figure 3-30 shows all cable connections to the Main PWA and the power supply. Figure 3-31 shows all cable connections to the carriage PWAs and Figure 3-32 shows all connections of the leg harness assembly.

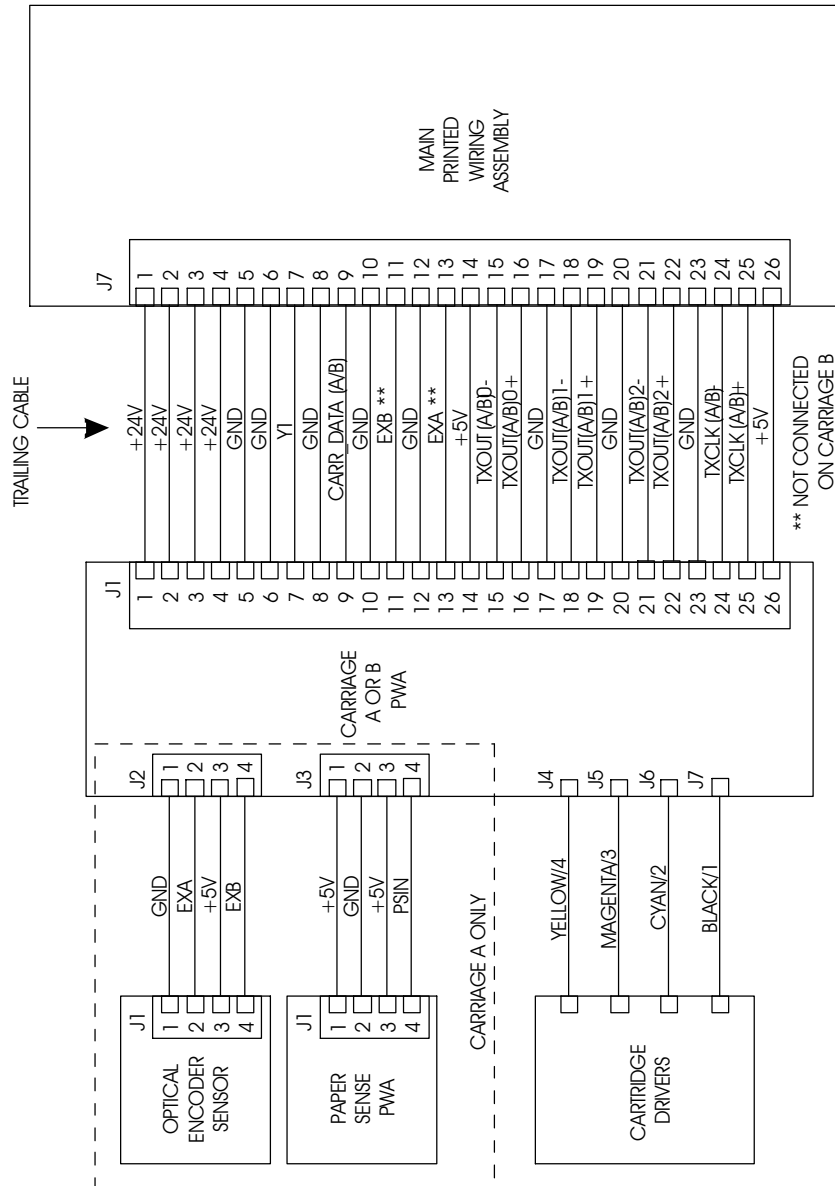


Figure 3-31. Carriage PWA Connections Diagram.

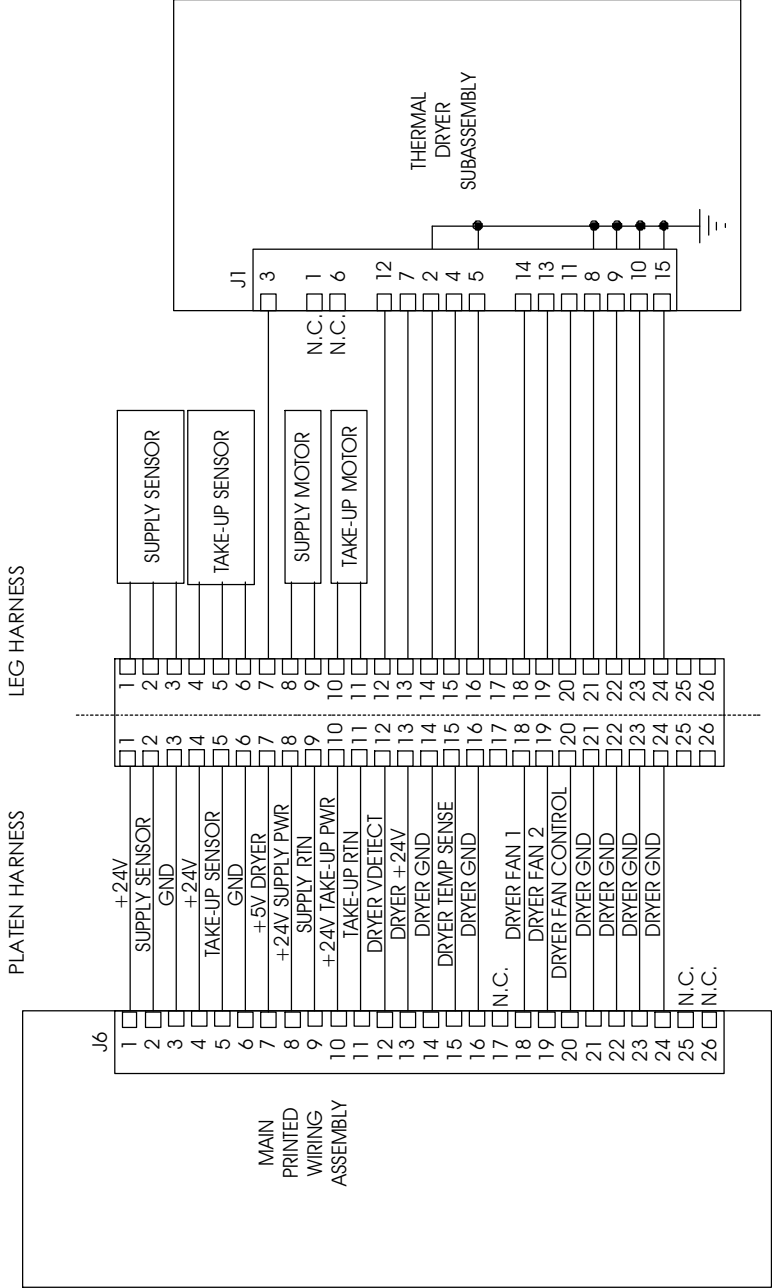


Figure 3-32. Leg Harness Connections Diagram.

# Troubleshooting

## 4

### Introduction

Chapter 4, Troubleshooting consists of a table that is intended to aide the technician in troubleshooting the **NovaJet 800** series printers. This table addresses symptoms with their possible causes and solutions.

Basic troubleshooting skills will be required to perform the symptom identification, troubleshooting, fault isolation, and repair of the printer when using this table.

Ensure that all applicable software diagnostic tests have been properly executed, all visual indications (including LED status) have been observed, and all applicable pushbuttons have been depressed to obtain a complete list of symptoms to be applied to the table below.

Use the table in conjunction with Chapter 3, Maintenance, whenever the table prompts you for additional information. This information may be in the form of an illustration, additional data, or a procedure that needs to be performed.

**Table 4-1. Troubleshooting Table.**

Symptoms	Possible cause	Solution
No Power	• printer not ON	depress power switch
	• faulty power cord	replace power cord
	• AC input not	replace AC entry

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
No Power	• printer not ON	depress power switch
	• faulty power cord	replace power cord
	• AC input not present at power supply	replace AC entry module
	• DC output voltage not present (see Figure 3-32 for pin-out)	replace power supply
	• DC voltage present at MPCB	replace MPCB
Initialization Failure	• DIMM unseated, defective or missing	reseat or replace DIMM
	• faulty take up or feed motor (if installed)	replace motor
	• faulty leg harness cable	disconnect at J3 on MPWA to test, replace as necessary
	• power supply defective	replace power supply

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Media Does Not Move	• trailing cable defective	replace trailing cable
	• perform Stepper Motor Winding Resistance check	replace stepper motor if out of tolerance
	• rough motion while spinning stepper motor	bad bearings - replace stepper motor
	• paper sensor not responding	replace paper sensor
	• media control switches are operating correctly	driver corrupted - reload printer driver
	• firmware corrupted	reload firmware in continuous run state
	• bad MPWA	replace MPWA
	• ESD discharge (electrostatic discharge)	ensure that <u>all</u> ESD components are properly installed then replace MPWA

**Table 4-1. Troubleshooting Table (cont).**

Symptoms	Possible cause	Solution
<b>Internal ERROR “Carriage Axis Failure”</b>	• dirty (or lubricated) slide shaft	perform Slide Shaft Cleaning procedure
	• perform Servo Motor Winding Resistance check	replace servo motor
	• check servo motor for smooth movement	bad bearings - replace servo motor
	• obstruction in path of carriage (may or may not be visible)	remove obstruction
	• dirty encoder strip	perform Encoder Strip Cleaning procedure
	• dirt under the carriage bushings	remove carriage bushings and clean
	• damaged encoder strip	replace encoder strip
	• bad encoder sensor	replace encoder sensor
	• worn outrigger bushings	replace outrigger bushings

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Internal ERROR “Encoder Sensor Failure”</b>	• worn carriage bushings	replace carriage bushings
	• loose trailing cable connections	remove power and reseal trailing cable connections at the MPWA and the carriage assemblies
	• cutter assembly malfunction	replace cutter assembly
	• damaged carriage drive belt system	1) check idler/tension assembly 2) check carriage belt
	• faulty trailing cable	replace trailing cable assembly
	• encoder sensor cable unseated	reseal encoder sensor cable
	• bad encoder sensor	replace encoder sensor
	• main PWA encoder sensor jack defective	replace main PWA

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Internal ERROR “Paper Sensor Failure”</b>	• servo motor and vacuum fan connections to MPWA are switched	reattach connections correctly (use Figure 3-4 for reference)
	• paper sensor cable unseated	reseat paper sensor cable
	• bad trailing cable assembly	replace trailing cable assembly
	• bad paper sensor	replace paper sensor
	• servo motor disconnected	check servo motor connections
	• trailing cable connection is faulty	reseat trailing cable (right carriage)
<b>Internal ERROR Auto-Load Paper Sensor Failure”</b>	• auto-load paper cable unseated	reseat auto-load paper cable
	• bad auto-load paper sensor	replace auto-load paper sensor

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Internal ERROR “MPCB Failure”</b>  <b>Unrecognized Cartridges Error</b>	• bad MPWA	replace MPWA
	• faulty connection of cartridge ID chip to flex cable	check cartridges
	• wrong cartridges installed	check cartridges
	• incorrect MB version	verify MB version (MB 87-27-0) and replace MPWA if -27-0 is not displayed.
	• carriage flex cable disconnected	check flex driver cable connections
	• trailing cable connections	reseat trailing cable
	• faulty trailing cable assembly	replace trailing cable assembly
	• faulty carriage PWA	replace carriage PWA (ensure both boards are the same version)

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
Media Sen Ref. Pts Not Initialized (NJ880 only)	<ul style="list-style-type: none"><li>• reference points were accidentally cleared</li></ul>	reset all eleven reference p9oints by performing the Media Ref Pts. Alignment
Image Skews or Moves	<ul style="list-style-type: none"><li>• dirty encoder strip</li><li>• defective encoder strip</li></ul>	<p>clean encoder strip (top and bottom)</p> <p>replace encoder strip</p>
Does Not Print	<ul style="list-style-type: none"><li>• bad connection between computer and printer</li><li>• firmware is corrupted</li><li>• defective trailing cable assy.</li><li>• faulty quad flex cable (either left or right carriage assembly.)</li></ul>	<p>reseat cable connections on computer and printer</p> <p>refresh EEPROM firmware with new download (in continuous run state)</p> <p>replace trailing cable assy.</p> <p>replace quad flex cable or complete carriage assembly</p>

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Ink Cartridge Misfiring</b>	• bad MPWA	replace MPWA
	• cartridge low on ink	refill or replace cartridge
	• defective septum needle	replace cartridge tubing needle/ septum assy.
	• ink drop out (ink starvation resembling intermittent banding)	lower ink pre-heat settings
	• flex contacts dirty or damaged	1) perform Flex Cable Contact Cleaning procedures  2) replace carriage flex cable (quad)
	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure  2) replace cartridge
	• cartridge not seated correctly	reseat cartridge
	• bad cartridge	replace cartridge

**Table 4-1. Troubleshooting Table (cont).**

Symptoms	Possible cause	Solution
<b>Ink Cartridge Misfiring (cont)</b>	• service station dirty or not properly sealing cartridge jet area	1) perform Service Station Cleaning procedures
		2) replace seal on service station
	• bad carriage PWA	replace carriage PWA
<b>Paper Skewing</b>	• bad MPWA	replace MPWA
	• paper guides not installed	install paper guides
	• stepper motor gearing dirty or damaged	perform Clean and Inspect Stepper Motor Gears procedure
	• lower roller loose	tighten screws securing lower roller
	• lower roller defective	replace lower roller assembly
<b>Printer Output is Banding (Horizontal)</b>	• if banding is consistent	1) inspect and/or replace stepper motor (perform Stepper Motor Winding Resistance Check)

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Printer Output is Banding (Horz.) (cont)</b>		2) inspect and/or replace stepper motor gears and/or lower roller assembly
		3) replace MPWA
	• insufficient ink in cartridges (normally 1/3 full)	replace or refill cartridges
	• cartridges need to be primed	perform Prime
	• color calibration required	perform Color Calibration
	• paper axis calibration required	perform Paper Axis Test Calibration
	• faulty or corrupt firmware	reload firmware (while in continuous run state)
	• cartridge dimple area dirty or damaged	1) perform Cartridge Dimple Cleaning procedure
		2) replace cartridge
	• flex cable contacts dirty or damaged	1) clean Flex Cable Contacts

**Table 4-1. Troubleshooting Table (cont).**

Symptoms	Possible cause	Solution
<b>Printer Output is Banding (Horizontal) (cont)</b>		2) replace carriage quad flex cable
	• carriage assembly obstructed	check carriage assembly for proper movement along Y-arm
	• carriage belt is loose, too tight, worn, or damaged	reinstall, check tension assembly, and/or replace belt
	• outrigger bushings worn or damaged	replace outrigger bushings and clean slide shaft
<b>Printer Output is Banding (Vertical)</b>	• carriage bushings worn or damaged	replace carriage bushings (4)
	• loose trailing cable connections	reseal trailing cable
	• faulty trailing cable assembly	replace trailing cable assembly
<b>Printer Output is Banding (Horizontally and Vertically)</b>	• dirty encoder strip	clean encoder strip
	• dirty encoder strip	clean encoder strip

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Keypad Locked-Up or Not Functioning Properly</b>	• defective encoder strip	clean encoder strip
	• bad MPWA	replace MPWA
	• firmware problem	1) reset printer 2) refresh or upgrade firmware (while in continuous run state)
	• keypad assembly damaged	replace keypad assembly
	• faulty connection between MPWA and keypad	reseat or replace connector
<b>Noisy Operation</b>	• bad MPWA	replace MPWA
	• ink or paper debris in printer	clean printer
	• obstruction in path of carriage	remove obstruction/ clean printer
	• outrigger bushings worn	replace outrigger bushings

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
<b>Line Quality Degraded</b>	• carriage bushings worn	replace carriage bushings (4)
	• debris or obstruction in fan	clean fan assembly
	• drive belt slipping on idler	replace frame tensioner, spring, or idler
	• hardware or assemblies loose	tighten hardware or assemblies
	• carriage height too low	perform Carriage Head Height Adjustment
	• lower drive shaft gears are dirty or misaligned	clean and/or realign lower drive shaft gears
	• noisy servo motor	replace servo motor
	• noisy stepper motor	replace stepper motor
	• ink cartridges dirty or clogged	clean and prime ink cartridges
	• cartridge dimple region dirty or damaged	clean or replace cartridge

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
	• color calibration needed	perform Color Calibration
	• deadband calibration needed (in bidirectional printing mode)	perform Deadband Calibration
	• debris or lubrication on slide shaft	clean slide shaft
	• leaks or bubbles in ink delivery lines	1) reseal/prime ink delivery lines on both sides  2) replace ink delivery lines
	• dirty encoder strip	clean encoder strip
	•outrigger bushings worn	replace outrigger bushings
	• carriage bushings worn	replace carriage bushings
	• drive belt worn	replace drive belt
	• drive belt slipping on idler	replace frame tensioner, spring, or idler
	• vacuum fan not operating	replace fan assembly

**Table 4-1. Troubleshooting Table (cont).**

Symptoms	Possible cause	Solution
<b>Fan Does Not Power Up</b>	<ul style="list-style-type: none"> <li>• MPWA has 24 VDC at J3 pins 1-2</li> </ul>	1) reseal connection at MPWA to fan 2) replace fan
	<ul style="list-style-type: none"> <li>• power not being applied to fan</li> </ul>	1) reload firmware 2) replace MPWA
<b>Media Take-Up Motor Not Operating, Sensor Works</b>	<ul style="list-style-type: none"> <li>• printer not in Take-Up Mode</li> </ul>	put in Take-Up Mode (under “Supply Type” from “Paper Option Menu”)
	<ul style="list-style-type: none"> <li>• bad connection to the motor</li> </ul>	reconnect Take-Up motor
	<ul style="list-style-type: none"> <li>• bad Take-Up motor</li> </ul>	replace Take-Up motor
	<ul style="list-style-type: none"> <li>• faulty wiring leg harness</li> </ul>	reseal or replace leg harness
	<ul style="list-style-type: none"> <li>• bad MPWA</li> </ul>	replace MPWA

**Table 4-1. Troubleshooting Table (cont).**

<b>Symptoms</b>	<b>Possible cause</b>	<b>Solution</b>
<b>Media Feed Motor Not Operating, Sensor Works</b>	<ul style="list-style-type: none"> <li>• bad connection to the motor</li> <li>• bad Feed motor</li> <li>• faulty wiring leg harness</li> <li>• bad MPWA</li> </ul>	<p>reconnect Feed motor</p> <p>replace Feed motor</p> <p>reseat or replace leg harness</p> <p>replace MPWA</p>
<b>Media Feed and Take-Up Motors Not Operating, Both Sensors Working</b>	<ul style="list-style-type: none"> <li>• printer is in Sheet Mode</li> </ul>	<p>put in Take-Up Mode (to activate both) or Roll Mode (to activate feed motor only), (under “Supply Type” from “Paper Option Menu”)</p>
<b>Media Feed or Take-Up Sensor(s) Not Operating</b>	<ul style="list-style-type: none"> <li>• reflective decal is dirty or blocked</li> </ul>	<p>clean decal and/or clear obstruction</p>

Table 4-1. Troubleshooting Table (cont).

Symptoms	Possible cause	Solution
	<ul style="list-style-type: none"><li>• reflective decal missing</li><li>• sensor not aligned correctly (sensor bracket bent or misaligned)</li></ul>	<p>replace reflective decal</p> <p>replace or reshape sensor bracket</p>

## Print Quality Issues

### Cartridge Misfires (Intermittent Banding)

Cartridge or print head misfires (clogged jets or misfiring jets) lead to microbanding in prints and can cause operational downtime. The Prime pattern tests all cartridge jets. Activate the Prime pattern several times to verify the problem. Any clogged jet or misfiring jet should be cleared through cleaning of the cartridge jet plate (See 'Routine Maintenance') or through Manual Jet Bypass (up to 20 jets may be manually bypassed in each color to maintain satisfactory print performance).

**Note 1:** Satisfactory print performance is defined for each give mode:

2x4 mode	3 pass print mode
1x8 mode	4 pass print mode
1x4R	4 pass print mode
1x4L	4 pass print mode

**Note 2:** Warranty is applied to cartridges that have 10 or more defective jets (100% filled blocks only.)



**Figure 4-1. Cartridge Misfire.**

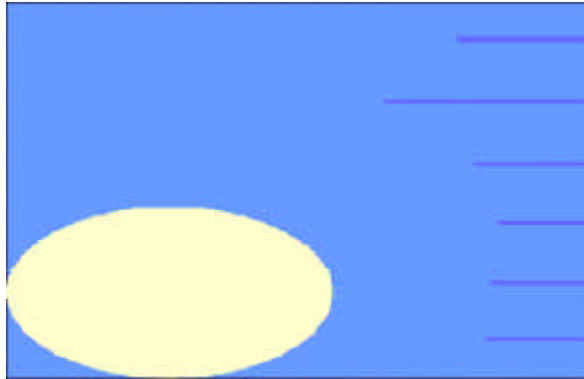
## Failure Analysis - Print Misfires

1. Ensure ink is in supply to cartridge jets? Are the ink lines full of ink at the reservoir tubing needles (connected to reservoir) and at the cartridge tubing/septum needles (connected to cartridges)?
2. Are the ink cartridges /contact points (flex contacts) dirty? Clean with isopropyl alcohol. Does the Prime pattern print correctly? Refer to Routine Maintenance.
3. For spitting or random ink droplets landing on the media, ensure the cartridges are only half full (20 ml) and that humidity ranges (10% to 70% RH non-condensing) are adhered to.



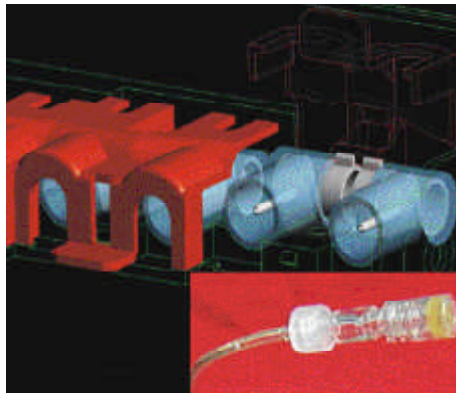
**Figure 4-2. Excessive Ink Pressure.**

4. Is the service station clean and working properly? Are the seals or wipers worn? Clean the service station under running water. Ensure all wipers stand up straight in the station. Replace service station as necessary.



**Figure 4-3. Dirty Service Station.**

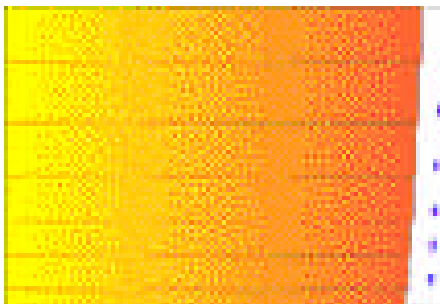
5. Are there any signs of leaking ink on or below the inkjet carrier assembly? This would indicate an air leak is in the ink delivery system. Ensure the septum connector fittings (3 parts make up the septum connector) are tight. Check all fittings. Replace cartridge septum connector and tubing needle, reservoir tubing needle, and female valve as necessary.



**Figure 4-4. Septum and Valves.**

6. Replace cartridge (printhead) and re-prime according to the Priming Procedures.
7. Is the flex driver cable connections seated properly at carriage

PWA? Reseat either the Right or Left Carriage PWA flex driver cable connections. The floating carriage cover must be removed first. Refer to Disassembly.



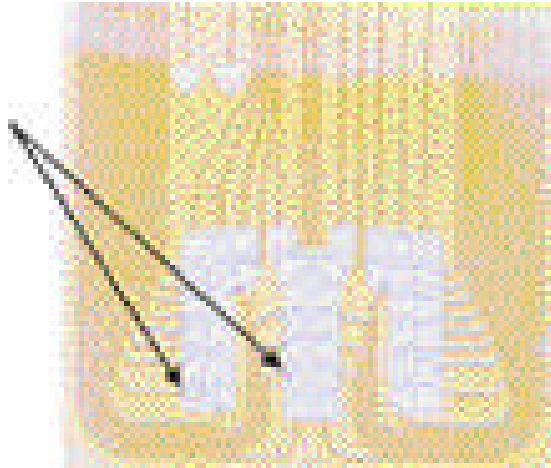
**Figure 4-5. Unseated Flex Driver Cable.**

8. Is the trailing cable damaged? Look for black runs or brown freckles in the cable. Brown freckles indicate excessive current is passing through the flexible printed circuit; a black line indicates severe burning of the line.
9. Check septum/needle fitting (or reservoir valve) for damage. Ensure the three septum parts are securely twisted together. Ensure reservoir cartridge tubing needle male valve snaps securely into female valve.



**Figure 4-6. Septum Connector.**

10. Is the tubing or chain damaged at either end of ink delivery system? Switch to another ink line to verify problem. Replace female reservoir valve for ink starvation issues. Refer to Ink Starvation.



**Figure 4-7. Damaged Flex Driver Cable.**

11. Inspect flex driver cables (on carriage). Has damage/ink attack occurred? Look at electrical dimples for charring or burn marks. Replace cable if damaged. Refer to Disassembly.
12. Reseat flex driver cable connection at the appropriate Carriage PWA For Left carriage stalls (1, 2, 3, or 4) or Right carriage stalls (Y, M, C, K). Refer to Disassembly.



**Figure 4-8. Defective Trailing Cable.**



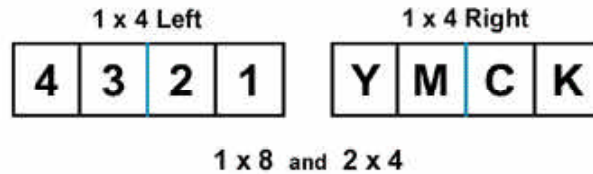
**Figure 4-9. Unseated or Defective Trailing Cable.**

13. Replace both trailing cables for vertical white gaps or spaces in the Prime pattern, jumps in color, or for irregular patterns with horizontal lines. Also refer to Microbanding. Refer to Disassembly for trailing cable replacement procedures.
14. Replace the carriage PWA for single or multiple color firing related problems. Note: The carriage PWA is responsible for printing all test patterns, calibrations, and prime patterns; i.e., a defective carriage PWA with a defective cyan driver will cause all printed cyan patterns to be incorrect. Only replace if this is the case. Refer to Disassembly.



**Figure 4-10. Defective Carriage PWA.**

If the color test appears like this example and other printing is faulty then the carriage PWA is defective.



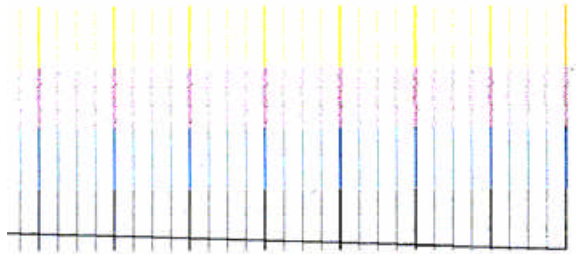
**Figure 4-11. Stall Configuration.**

Ensure the left or right Carriage PWA is tested properly.

15. Replace the Main PWA only if a specific test pattern, calibration, or jet sequence fails to print. Magnetic tipped screwdrivers are known to have caused these types of Main PWA failures in the past. Please exercise caution when handling circuit assemblies and always attach an electrostatic discharge (ESD) wrist strap. Refer to Disassembly.

## Common Misfire Problems

Cartridge electrical contacts may have oil or ink on surface (clean with isopropyl alcohol). See illustration below for an example of a defective magenta cartridge.



**Figure 4-12. Magenta Cartridge Misfires.**

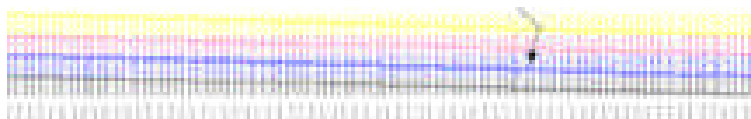
Carriage assembly flex driver cable may have ink or debris on contacts (clean with alcohol).

## Clearing Cartridge Misfires

- Press lightly against jets with a water/alcohol moistened lint-free cloth. Blot gold jet plate area, do not wipe.
- Insert cartridge and initiate a Color Test @ 100% in the 2-pass mode.

**Note:** running the color test in the single pass mode severely reduces printhead resistor life.

For severe clogs use ultrasonic cleaner (30-40 sec) or hot water (10-15 sec) to break down kogation (clogging of jet plate holes) at nozzle.

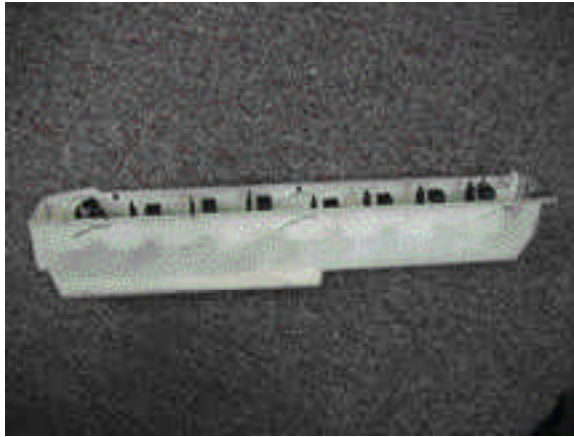


**Figure 4-13. Adjacent Jet Misfire (Cyan).**

**Note:** Adjacent misfires in the prime pattern will cause microbanding. These types of misfires must be manually compensated or cleared through cleaning procedures.

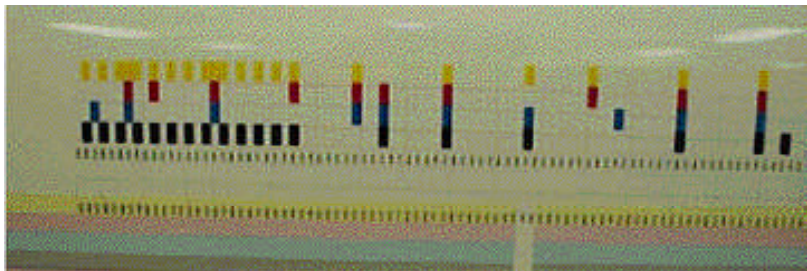
## Multiple Cartridge Failures

- Assuming cartridges/flex driver cables are clean and connectivity is good recommend to customer to replace service station (should be replaced every 6 months). Check ink lot codes of possible contamination. Contact technical support.



**Figure 4-14. Service Station.**

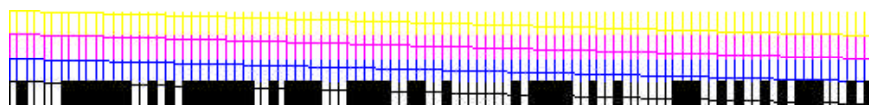
If failures are occurring within 40 ml of ink throughput, improper cleaning of electrical contacts on carrier or a connectivity problem probably exists. Driver chips on the carriage PCB are known to have blown multiple cartridges in a row and vice versa. Some cartridges can affect other cartridges via the flex driver cable connectivity. Use post-it note trick (attach a post-it note to the electrical contacts on rear side of print head or cartridge, but do not cover the two identification circuit chip contacts) to diagnose the defective cartridge in these cases:



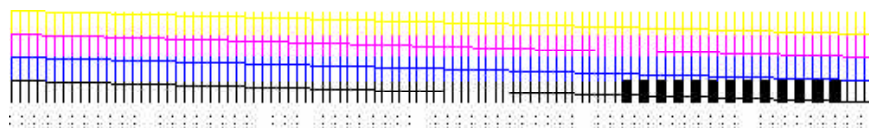
**Figure 4-15. Defective Cartridge Power Lines.**

Initially cartridges should be replaced, but further investigation is required.

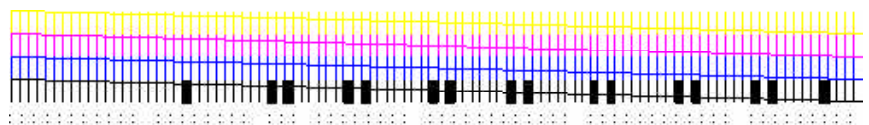
Some types of address line and power line failures are below:



**Figure 4-16. Catastrophic Jet Failure.**



**Figure 4-17. Power Line Failure.**



**Figure 4-18. Address Line Failure.**



**Figure 4-19. Multiple Address Line Failure.**

## Microbanding

Minimal microbanding normally occurs in the production modes (1, 2, and sometimes 3 pass print modes) with dense images and depending on the color fill it may occur in the photo mode, but should never occur in the enhanced modes. The lighter pastel shades quite often exhibit microbanding.



Figure 4-20. Microbanding.

Refer to the following table for the differences between quality modes in the 1x4 and 2x4 configurations.

**Note:** 6 pass, speed 10 is the true photo mode in 1x4 operations.

Quality Modes for 1x4 Right and 1x4 Left Cartridge Sets					
Quality Mode	Color Mode	Dots per Inch	Print Passes	Carriage Speed	Print Direction
Production	Color	600	2	10	Bi
Photo	Color	600	6	10	Bi
Enhanced	Color	600	6	10	Bi
User	User Defined				

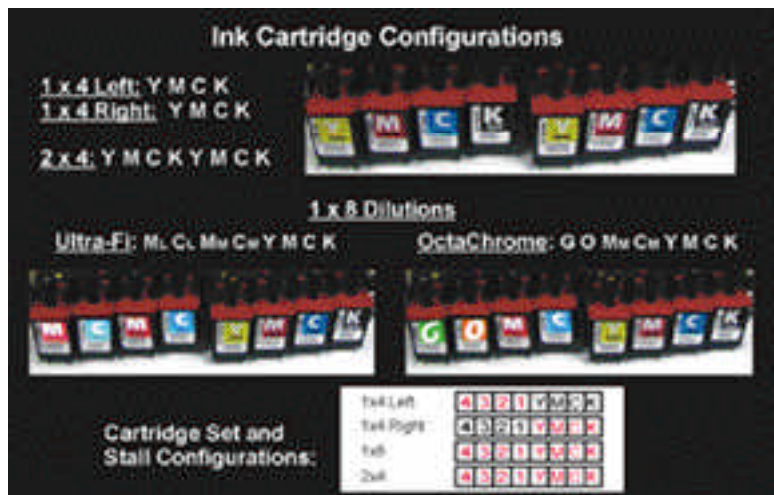
Quality Modes for 2x4 Cartridge Set					
Quality Mode	Color Mode	Dots per Inch	Print Passes	Carriage Speed	Print Direction
Production	Color	600	2	10	Bi
Photo	Color	600	3	10	Bi
Enhanced	Color	600	4	10	Bi
User	User Defined				

Figure 4-21. Quality Print Modes.

## Banding Differences

Consistent horizontal banding is usually hardware related. Normally, horizontal microbanding is caused by improper color deadband or color calibrations, dirty cartridges or service station. Inconsistent banding is usually software related. However, electrostatic discharge (ESD) from media (i.e. Backlit/Duratrans films) can also cause inconsistent horizontal banding. While minimal microbanding in an image typically occurs due to cartridge jet failures and clogs, dirty service station or an improper calibration of the printer, gross microbanding can be caused by a dirty encoder strip causing image skew or real hardware failures such as a defective stepper motor.

Vertical banding is always hardware related.



**Figure 4-22. Ink Cartridge Configurations.**

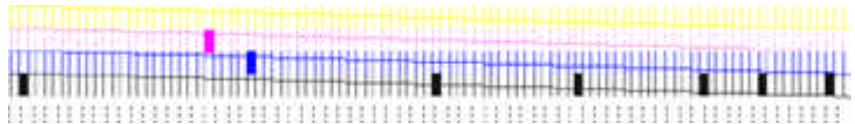
Ensure that the cartridges are properly installed particularly for 1x8 print modes.

Refer to the following Horizontal and Vertical Banding paragraphs for more information.

## Horizontal Banding

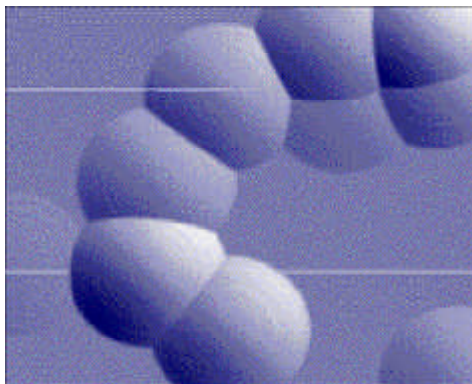
1. Check the print mode for the type of image being printed. Is the enhanced print pass mode printing OK? Note: photo pass mode may microband in some of the 2 tone color ranges including blue, gray, orange, and purple hues. Enhanced modes should not microband.

Check to see if the media is loaded correctly and is of proper thickness (no greater than 20 mil media can pass through the machine). Check to see if the media guides are in place and are not defective. Check the pinch rollers for alignment/damage.



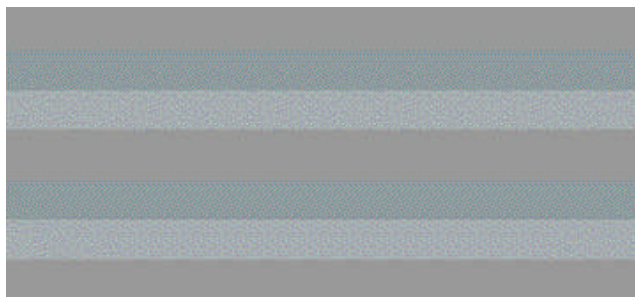
**Figure 4-23. Defective Magenta Cartridge.**

2. Are the color deadband and color calibrations correct? Refer to Printer Calibrations. Inspect the Prime pattern and verify diagonal line in the jet test is consistent throughout. The diagonal line in the Prime pattern should not have sections or lighter and darker shades, it should not be dissolved or broken. Refer to Printer Features - 'Jet Out Detection'. Clean, manually bypass clogged jets, or replace the cartridge if any of these abnormal conditions exist. Defective or clogged cartridges account for 90% of the banding observed.
3. Change the preheat setting for the affected color. To gain access select SetUp Menu, Ink Option Menu, Ink PreHeat Settings, choose the appropriate color. If this does not help, then return settings to zero (0) default at completion of test.



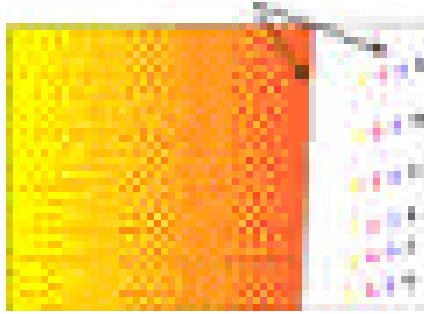
**Figure 4-24. AutoWipe Interference.**

4. Ensure the Auto-Wipe feature is turned off. To gain access select SetUp Menu, Paper Option Menu, Auto-Wipe, select off. Auto-Wipe of the carriage head (occurs every 2 minutes when activated) can cause a dry band to appear on the print. This feature is normally defaulted off.



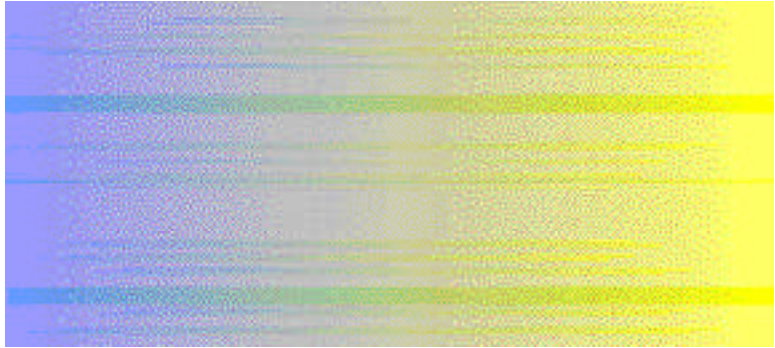
**Figure 4-25. Improper Grounding.**

5. For direct printing environments, ensure all switchboxes and cables are IEEE 1284 compliant.

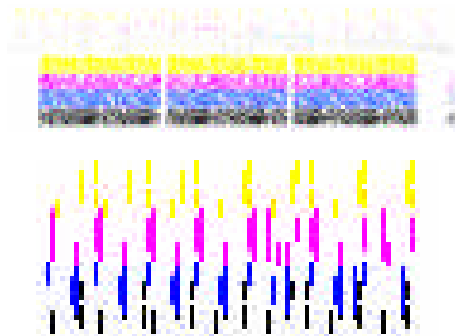


**Figure 4-26. Unseated or Defective Trailing Cables.**

6. Clean the cartridge electrical and carriage flex driver cable contacts with isopropyl alcohol. Refer to Routine Maintenance. Reseat the flex driver cable connection for print images which contain vertical bar patterns along the right edge of print. If more than one color (represented by the vertical bars) is present then the trailing cable is either unseated or defective.
7. Clean the encoder strip (top and bottom), slide shaft and inside of carriage belt with distilled water or isopropyl alcohol.

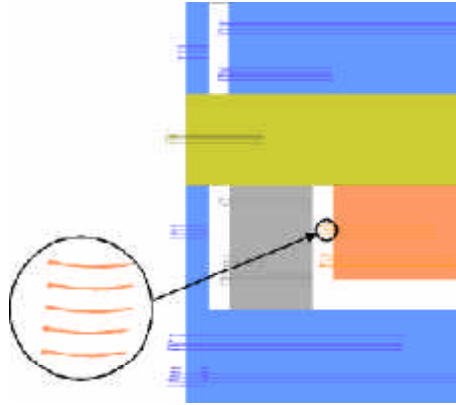


**Figure 4-27. ESD Problems.**



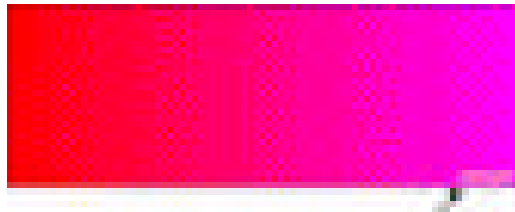
**Figure 4-28. Defective Carriage PWAs.**

8. Change media to see if electrostatic discharge from media is causing the banding to occur. Add 3rd party static eliminator protection if required.



**Figure 4-29. Carriage Head Strike.**

9. Ensure the vacuum fan or fans are providing adequate suction for media. If the exhaust grill (s) are installed incorrectly then carriage head scraping will occur on the media causing streaking or inconsistent banding. This could also be due to thick media (greater than 20 ml) or possibly canvas or vinyl exposed to high humidity which then becomes still.
10. Turn printer off. Slowly move carriage head back and forth manually to ensure no obstructions are causing the print defects observed (i.e. tape on the rear cover, tie-straps under the electronics cover, or low carriage head height).
11. Verify connectivity through E-Connect, SEH, or the built-in print server. Contact technical support for network configuration procedures. Improper connectivity can cause low data transfer problems and may provide “false starts” of the printer carriage (carriage moves out but does not execute print operations).



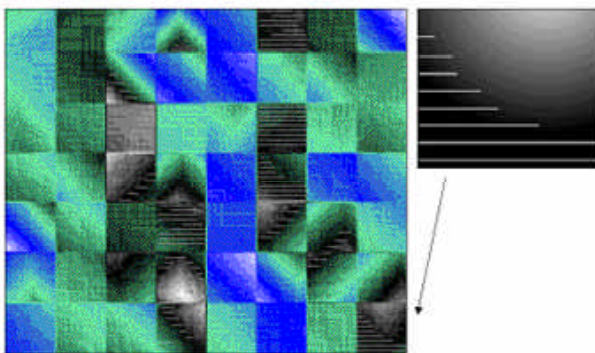
**Figure 4-31. Low Data Transfer Problem.**

12. Print a test RTL file to verify banding, if banding is absent, then check software. Obtain the service or support CD or Customer's Demo Images CD and refer to 'Demonstration Print' for proper procedure. Print at least 50% of the test print before deciding the next course of action. The Test Print (Utility Menu, Service Menu, Test Print) may be used, but this test is a compressed vector based file and may exhibit certain dithering properties different from that of another rasterized print.



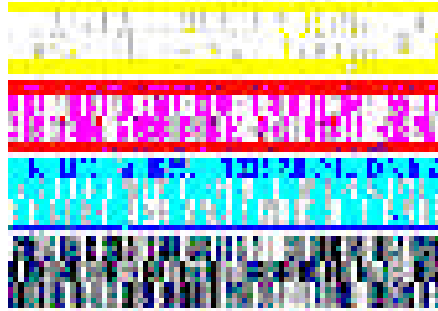
**Figure 4-32. Test Print.**

13. Refer to 'Cartridge Misfires' and 'Ink Dropout' to ensure all other troubleshooting checks have been made.



**Figure 4-33. Misfiring Jet.**

14. For single color or multiple color print failures replace the carriage PWA. If normal test patterns (i.e., Color Test and normal basic test patterns) are seriously degraded then replace the carriage PWA. Refer to Disassembly.



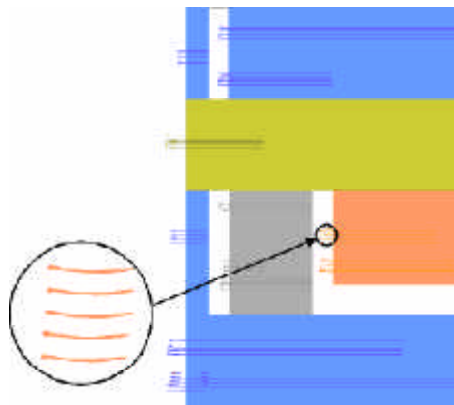
**Figure 4-34. Defective Carriage PWA (Color Test).**

15. Inspect and clean stepper motor and lower roller drive gears if printer is older than 5 years. (Every two years if printer is used for textile printing.) Other unique microbanding causes include synchronization errors from the stepper drive system due to defects or gear cleanliness.



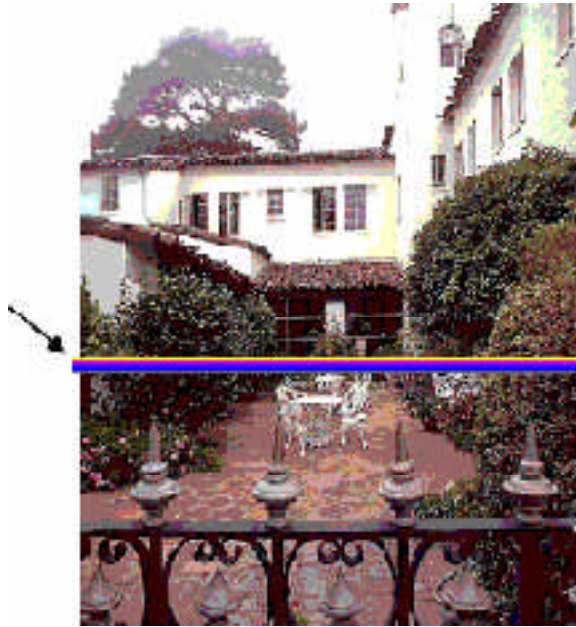
**Figure 4-35. Defective Stepper Motor.**

16. Replace stepper motor for consistently spaced horizontal patterns (2 - 10 mm apart) when printer is run in the enhanced modes with a test print. Often a lower roller drive noise will accompany the banding. Inspect stepper motor gearing/lower roller for damage/debris (ensure screws are tight). Check stepper motor winding resistance (7.2-8.0 ohms; check full 360-degree rotation)



**Figure 4-36. Defective Stepper Motor.**

17. Check carriage head height when jet plate scrapes appear on media. The Banding will have jagged or slightly angled lines at the termination points or may even appear as light cuts in the media (like a utility knife cut the surface of a print). The normal head height range between the bottom surface of the cartridges and the platen surface is 0.062" to 0.068". Refer to Alignments.



**Figure 4-37. Servo System Synchronization Failure.**

18. Replace the servo motor for horizontal bands (thicker than 2 mm) which extend beyond the page layout from .5 mm to 20 mm. The servo motor bearings may be faulty which cause excessive drag and 'carriage axis errors'. The normal servo motor life is approximately 2800 plot hours (2.8 million servo cycles).

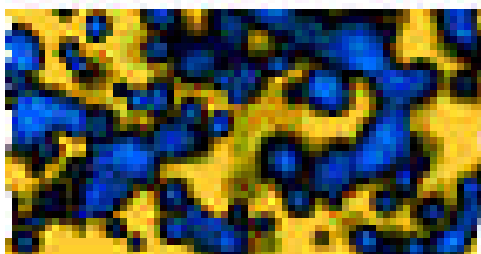
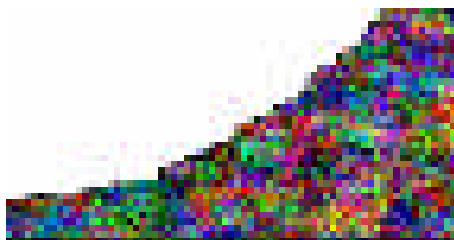


**Figure 4-38. RIP Error.**



**Figure 4-39. Connectivity Problem .**

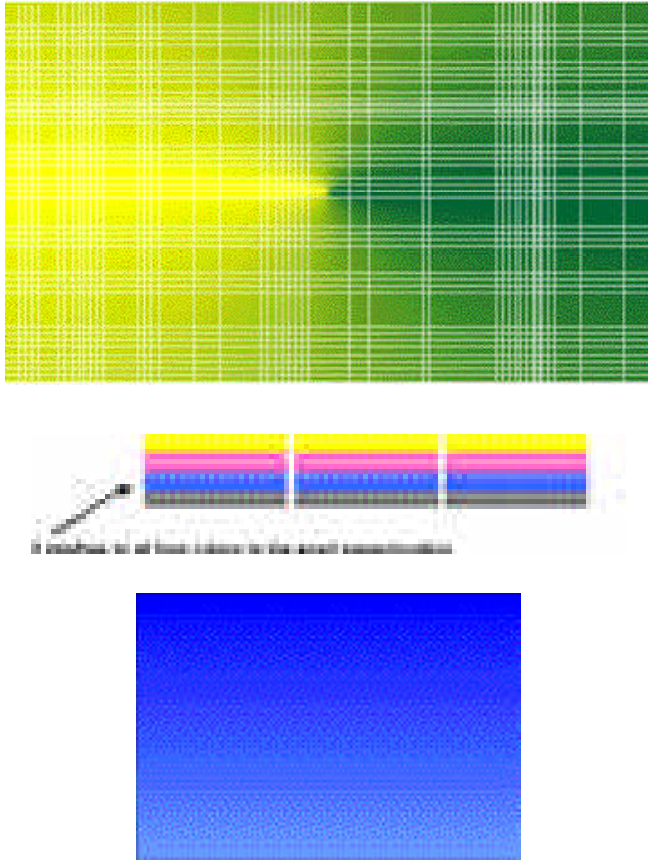
19. Horizontal bands (0.2 mm to 1 mm) which extend beyond the page layout are usually caused by the RIP or workstation memory or the driver not having sufficient work space or other network data flow related problems. Ensure 1GB is free on hard drive at all times; 256 MB of memory is suggested.



**Figure 4-40. Dirty or Defective Encoder Strip.**

20. Clean or replace encoder strip for image skewing (image walking or skipping). Whether the image skews slightly or off the page the encoder strip is at fault. Typically images which skew will have some horizontal banding, often a walking image can also

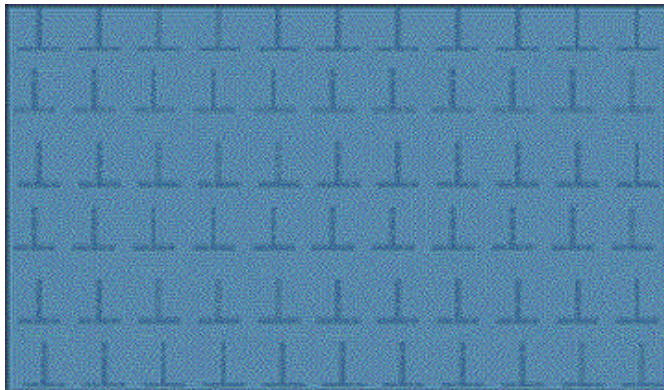
create vertical bands to appear in the print. Refer to 'Routine Maintenance' for cleaning or 'Disassembly' for encoder strip replacement.



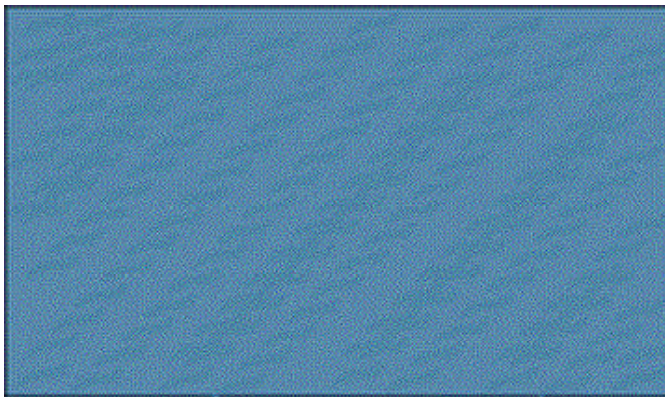
**Figure 4-41. Main PWA Failures.**

21. Replace Main PWA for severe horizontal and vertical banding patterns. Also replace Main PWA or for specific internal file failures (i.e. Prime pattern displays a pattern where the same jets in all colors fail to fire even after thorough cleaning and cartridge replacement or if only half of the color calibration prints). Refer to Disassembly.

If the color in an output image tends to vertically shift in color (over 1 meter slowly) then the Main PWA is suspect of having a problem.



**Figure 4-42. RIP Problem.**

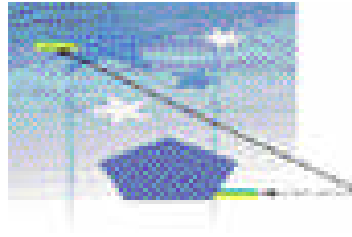


**Figure 4-4. Bent Servo Motor Pulley.**

22. For phantom images in output, verify RIP is not causing the problem by performing a demonstration print from the Support or Customer's Demo Image CD. Additional problems such as diagonal banding could be due to a defective Servo Motor pulley.

23. Diagonal banding is often RIP related. Lines protruding from text on vertical bands in text are typically errors within the applications text field.

## Vertical Banding



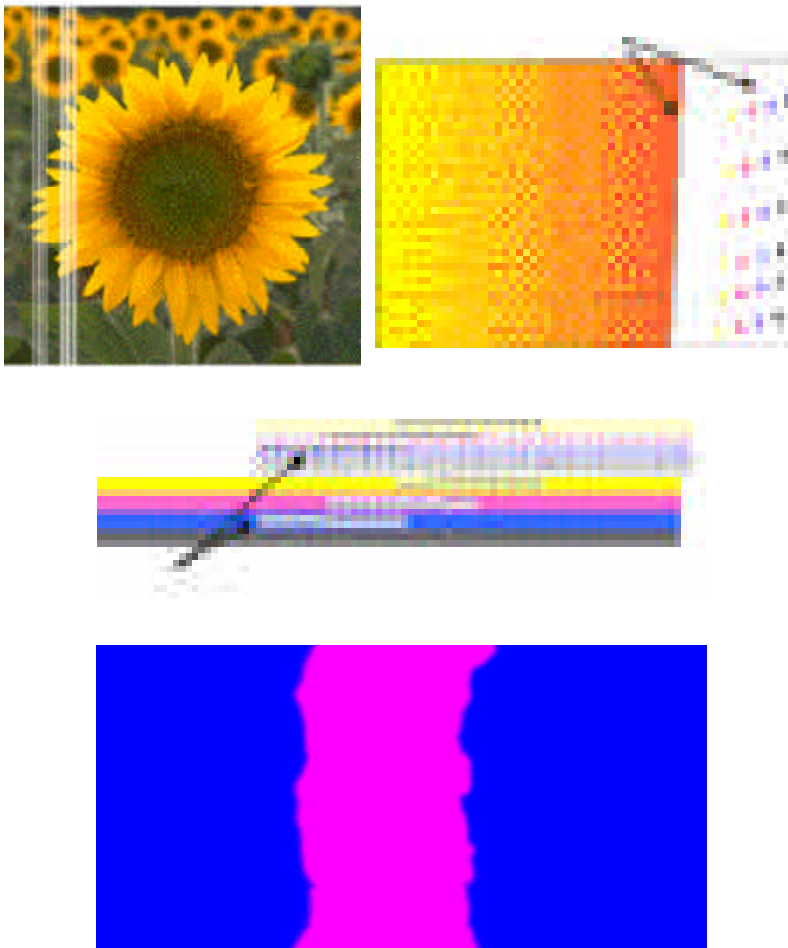
**Figure 4-44. Dirty or Worn Carriage Bushings.**



**Figure 4-45. Worn Bushings or Bushing Pads.**

1. For vertical banding check carriage bushings for wear and ensure the bushings are free of dirt and ink residue buildup. Perform the carriage vibration test under 'Diagnostics' Menu, the lines should print fine with no jagged edges. Clean the bushings with a dry lint-free towel if necessary. Replace all carriage bushings and both outrigger bushings. Refer to Disassembly procedures.

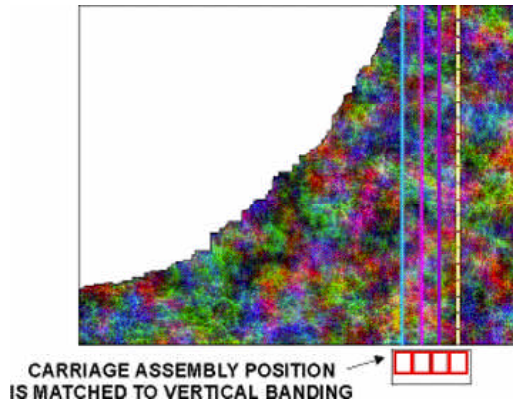
2. Rotate image in software 90 degrees and/or print a test RTL file to verify banding. Obtain the Sample Images CD and refer to 'Demonstration Print' for proper procedures.



**Figure 4-46. Defective Trailing Cable Examples.**

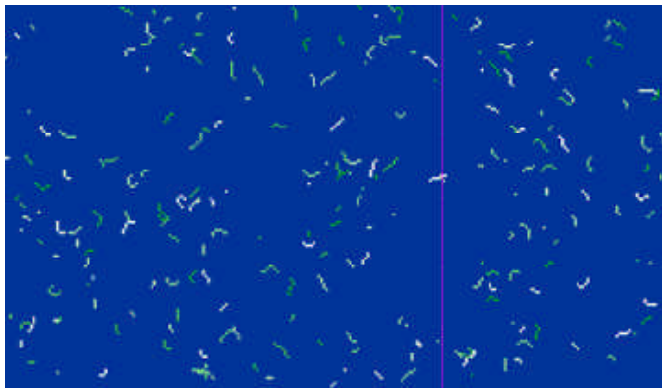
3. Replace the trailing cable assembly prior to any circuit assembly replacement. Replace trailing cable assembly for vertical jumps in color (i.e. one color does not print through one part of the print, the image appears to have a vertical pattern) or for vertical white spaces down a print. Replace the trailing cable assembly if

multiple sets of vertical bars appear along the right edge of the print, usually containing CMYK colors. The image may also be 'pushed' slightly to the left side of the printing area. Refer to Disassembly.



**Figure 4-47. Dirty Encoder Strip.**

4. Clean and/or replace encoder strip for image skewing (image walking or skipping). Typically characterized as horizontal banding, often a walking image can also create vertical bands to appear in the print. Refer to 'Routine Maintenance' for cleaning or 'Disassembly' for encoder strip replacement.



**Figure 4-48. Defective Teflon Strip.**

5. Check pinch roller for proper height and encoder stabilizer bracket teflon strip for bubbles. Replace teflon strip/encoder stabilizer bracket assembly if problems persist.

### Line Quality Problems (Overspray)

1. Check the print mode. The enhanced modes should not exhibit any overspray problems. Are any compression utilities being used? Avoid embedding text onto a layer that is compressed or resized within the application. This is known to cause apparent overspray like symptoms when printed.



**Figure 4-49. RIP Error (Page Layout Violation).**

**NOTE:** corrupted files during RIP processing or insufficient memory (i.e., at NT workstation) particularly can cause a single line to project from an image:

2. Are the color deadband and color calibrations correct? Refer to Printer Calibrations.
3. Check the ink cartridge jet plate for buildup and ink residue if streaks occur on the right side of print. Refer to Routine Maintenance.
4. Clean the encoder strip (top and bottom), slide shaft and inside of carriage belt with distilled water or isopropyl alcohol. Refer to Routine Maintenance.
5. Check outrigger bushings and carriage bushings for wear and for cleanliness. Refer to Vertical Banding and Routine Maintenance.
6. Ensure vacuum fan or fans are providing adequate suction for media or head scrapes will occur. Refer to Horizontal Banding.



**Figure 4-50. ESD Problem.**

7. Change media to see if electrostatic discharge from media is causing the banding or ink over-spray to occur. Add 3rd party ESD protection if required (static eliminator strip).
8. Perform the carriage vibration test under 'Diagnostics' Menu, the lines should print fine lines with no jagged edges.
9. Print a demo print from the sample images CD. If no overspray or similar problems show, then check the software driver or original file. Draw a simple box and send to print from application; default line thickness should be 0.008" (AutoCAD). Check printed output for correct line thickness. Obtain the Servicing Support CD and refer to 'Demonstration Print' for proper procedures. Ensure the demonstration print is correct.

## Cartridge Warranty

To check cartridge ink throughput select Utility Menu, Service Menu, Cartridge Info. There is a 500 ml warranty on the print heads; the cartridge shuts off at 1280 ml (NJ850) or 1500 ml (NJ880) with a "Cartridge End of Life" message and the cartridge must be replaced.

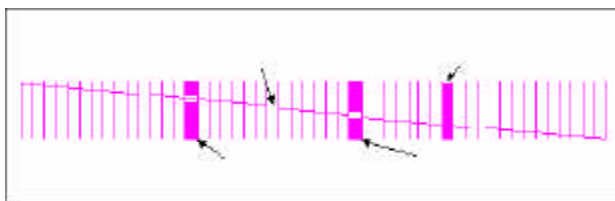
Note: replace defective cartridge with a warranty cartridge if less than 500 ml throughput and a problem cannot be corrected with cartridge cleaning or manual jet bypass (see Cartridge Maintenance & Testing) below.

Perform 'Cartridge Maintenance & Testing' before calling technical support or your service representative. These steps must be performed before cartridges will be replaced in any event.

## Cartridge Maintenance & Testing

ENCAD cartridges are engineered for optimum reliability and compatibility with ENCAD inks. If diminished print quality is observed, please follow these simple steps:

1. Scroll through the printer display to obtain total ink throughput. If the cartridge displays greater than 100% or 500 ml of ink throughput, the cartridge has reached its warranted life. ENCAD's cartridge management system assures the highest quality and reliable productivity through the useful life of the cartridge, which may extend beyond the cartridge warranty period. In order to ensure the quality of output, the cartridges will shut off after 1280 ml (NJ850) or 1500 ml (NJ880) of ink throughput. If the cartridge has reached the end of its life it should be replaced. If not, go to Step 2.



**Figure 4-51. Jet Out Detection.**

2. Enabling open jet compensation (see 'Manual Jet Bypass') will often dramatically improve print quality. If enabling open jet detection and/or activating the manual jet bypass feature on problem jets (clogged/misfiring jets) found in the Prime pattern does not improve image quality, go to Step 3.
3. Cleaning the jet plate with distilled water and a lint-free cloth should clear any jets stopped by dust particles or other physical obstructions. Vigorously blot the gold jet plate area on the bottom of cartridge with the heavily dampened lint-free cloth. Repeat several times. For cartridges which have not been used for longer

than 2 weeks apply hot water towel to jet plate area for 15 to 30 seconds. If cleaning the jet plate thoroughly and re-priming the cartridge does not improve print quality, go to Step 4.

4. Run a prime and inspect the printed lines. If the photo mode is not supported as indicated by the Prime Pattern jet out detection and the previous three steps have already been performed, contact ENCAD Technical Support or your service representative.

### **General Print Misfire Analysis**

- Is ink in supply to cartridge jets?
- Are the ink cartridges /contact points (flex contacts) dirty or damaged?
- Is the service station clean and working properly - seals/wipers worn?
- Are there any signs of leaking ink on or below the inkjet carrier assembly?
- Is the flex driver cable connections seated properly at carriage PWA?
- Is the trailing cable damaged? Look for black runs or brown freckles in the white cable.
- Is the septum connector or quick connect fitting damaged? - do reservoir valves snap in securely?
- Is the ink delivery system tubing/chain damaged?
- Inspect flex driver cables (on carriages) - has damage/ink attack occurred?
- Reseat flex driver connection at Carrier PWA (service required).
- Replace the trailing cable assembly (service required).

### **Common Misfire Problems**

- Cartridge electrical contacts may have oil or ink on surface (clean with isopropyl alcohol).
- Carriage assembly flex driver cable may have ink or debris on contacts (clean with alcohol).



**Figure 4-52. Cartridge Cleaning.**

### **Cartridge Misfires**

- Press lightly against jets with a water/alcohol moistened lint-free cloth. Blot. Do not wipe.
- Insert cartridge and initiate a Color Test @ 100% density in a 2-pass print mode.

For severe jet clogs use ultrasonic cleaner (30-40 sec) or warm to hot water (10-15 sec) to break down clogging at nozzle.

### **Multiple Cartridge Failures**

- Assuming cartridges/flex driver cables are clean and connectivity is good recommend to customer to replace service station (should be replaced every 1000 print/plot hours).



**Figure 4-53. Service Station Cleaning.**

- If failures are occurring within 40ml ink throughput, improper cleaning of electrical contacts on carriage or a connectivity problem probably exists.
- Initially cartridges should be replaced, but further investigation is required.
- Check ink lot codes with technical support to screen for contaminated ink problems.

### **Ink Starvation**

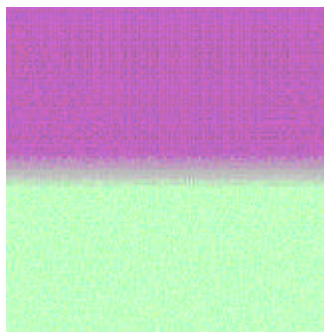
- Ensure cartridge is properly primed, run color test @100% in 2 pass print mode. Verify a solid color pattern prints (ignore the poor quality of color test - this test is used to check ink delivery system and cartridge pressure only).

## **Inkjet Nozzle Problems**

- Resistor burnout - no firing (175 million firings average per resistor). Severe clogging may be cleared using ultrasonic cleaner (30-40 sec) or hot water (10-15 sec).

## **Ink Starvation**

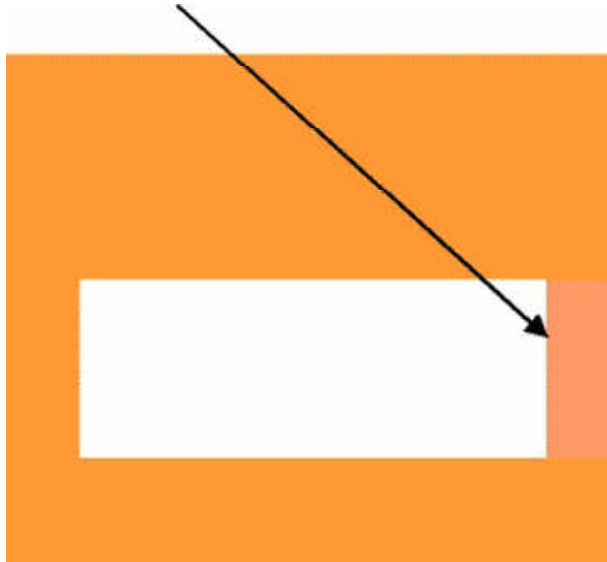
Ink starvation of one or more colors can occur between 10 minutes and 3 hours of operation due to improper system setup or a defective ink delivery system (air leak in the system). Check pressure in the lines by initiating a Color Test in the 2 pass print mode. Repeat test several times to verify pressure. All swaths in each color should print at 100% ink density from the 2-pass print configuration (50% ink load on each pass). If the starvation stops and starts as the color test progresses (i.e. the first swath starts to print then starves, the second swath prints and then also starves) then the cartridge most likely does not have enough ink inside (typically the cartridge should have between 15 and 30 ml of ink; cartridge ink level will eventually stabilize at 19 ml). Check cartridge ink level using the syringe and syringe tip provided with the printer. For all other color test printing failures please refer to the failure analysis checks below.



**Figure 4-54. Magenta Ink Pressure Failure.**

### **Ink System Pressure Theory**

The ink system works on less than 1/10 psi pressure. The reservoir caps should remain loose to allow for atmospheric pressure to push down on the ink to provide adequate pressure on the ink. The purpose of the cartridge priming procedure is to establish -2 to -5 inch head pressure in the upper chamber of the cartridge. The cartridge must have between 15 and 40 ml of ink inside the cartridge for adequate printing pressure. Proper cartridge pressure and ink level is required for long print operations.



**Figure 4-55. Ghosting.**

Ghosting is a phenomena of inkjet technology. Adjust pre-heat levels to help correct. The temperature control mode on the NJ880 is the default setting by may be changed to preheat to help offset the ghosting effects observed.

**Failure Analysis:**

1. Ensure the cartridge is properly primed and pressure has been established inside the cartridge (see SetUp procedures) Note: When priming the cartridge it is important to ensure the suction end of the EasyPrime or NovaPrime assembly is flush against the cartridge jet plate. Prime cartridge using 3 consecutive 1 second bursts and then wait 5 seconds, repeat 4-6 times over a 1 minute period. A sucking noise should be heard from the EasyPrime or NovaPrime when procedure is performed correctly.
2. Ensure the reservoirs are properly attached to the female valves otherwise this may cause ink starvation in the ink delivery system after only 10 minutes of print operations.



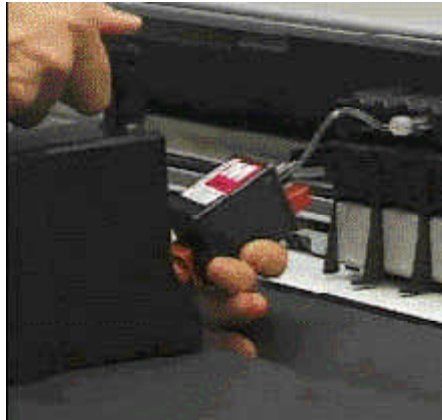
**Figure 4-56. Cartridge Tubing Needle and Septum.**

3. Ensure the cartridge needle septum connector assembly is tightly secure. The assembly is composed of three parts which must be tightly twisted together (do not overtighten!). Also, ensure the printer is level on floor. A height difference from one side of the printer to the other can also cause ink starvation.
4. Ensure the septum/cartridge tubing needle is properly connected between the cartridge and carriage assembly. Replace reservoir tubing needle and/or cartridge tubing needle if pressure is lost after the procedure has been performed (a leak is present in the line).



**Figure 4-57. 208 Jet Cartridge.**

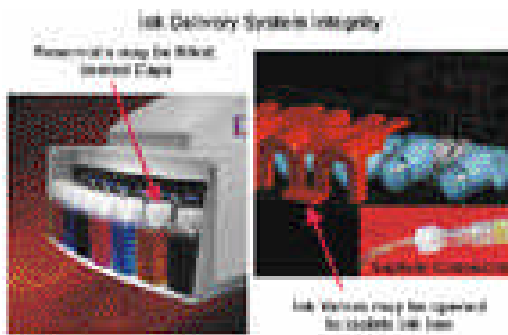
5. Replace the cartridge with a new cartridge (print head). Re-prime the ink delivery line.



**Figure 4-58. EasyPrime Operation.**

6. If ink cannot be pulled through the line using the EasyPrime device ensure the device is functioning correctly by verifying suction and check the 4 AA batteries in the unit. Replace the 4 AA batteries in the EasyPrime unit.

7. Always run a color test @100% in the 2 pass print mode to verify the proper pressure levels have been achieved within the cartridge.
8. Replace the septum connector and attached cartridge tubing needle.
9. Replace reservoir tubing needle.
10. Replace the blue or gray valve in the floating carriage cover. Refer to Disassembly.
11. Replace the blue or gray female valve near reservoir.
12. Replace the ink reservoir.



**Figure 4-59. Reservoirs and Ink Delivery System.**

13. Replace the ink delivery system.



**Figure 4-60. Excessive Ink Pressure.**

**Caution:** overfilling the cartridges with ink (greater than 35 ml) can cause pressure regulating problems in the ink delivery system where large ink droplets can fall from cartridges, thus damaging the prints. High humidity in the printing environment and a dirty environment can also cause large ink droplets to form.

## Ink Dropout

If the printer is experiencing ink dropout or temporary ink starvation conditions it can be improved by modifying the preheat settings under the 'Ink Option Menu'. Symptoms include horizontal bands that recover in all cases and the typical banding pattern can either be consistent or inconsistent. Please refer to the illustration below of the typical symptoms encountered. Note: the vertical edges of the print are not skewed or exhibit swath shift. If swath shifts are observed then this is a servo motor or bushing problem.

**NOTE:** The horizontal bands do not extend beyond the page layout or edges of the print.



**Figure 4-61. Excessive Ink PreHeat Settings.**

The preheat settings are factory set to default settings of 0 (zero) and are dependent upon the installed ink set. These settings are to aid in the minimization of ghosting and or ink density issues. The preset heater settings in conjunction with the ambient or surrounding temperature could be causing the cartridge to get too hot. This could cause the ink to boil inside the jetplate and create air bubbles. Air bubbles in the ink will result in ink starvation and dropout problems. Excessive heat also causes the viscosity to reduce (gets thinner) which can create pooling or puddling on the jetplate. This in turn can result in random spitting and burping due to excessive accumulation of ink on the jet plate.

The following preheat settings are recommended for each stall position to prevent ink starvation and dropout from occurring.

Yellow (Y)	0 - default setting
Magenta (M)	0 - default setting
Cyan (C)	0 - default setting
Black (K)	0 - default setting
1	0 - default setting
2	0 - default setting
3	0 - default setting
4	0 - default setting

As mentioned above the ambient or surrounding temperature does have an effect on the heating of the ink. ENCAD has established that these settings will be adequate for most installations. However, if the printer is in an environment that is hot or that the temperature changes a lot throughout the day, you may have to modify the settings to compensate for your own individual circumstances.

The preheat settings are factory set to aid in the minimizing of ghosting and or ink density issues. With this in mind, lowering the settings could cause improper output to appear.

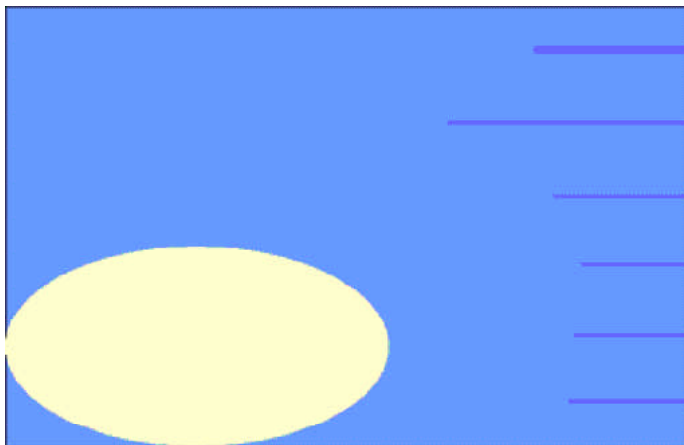
The settings of the preheat will be dependent upon your environmental condition as well as the type of image and the colors that you are reproducing. One particular setting of the preheat may not be correct for every print application.

**To check the preheat settings for the problem color (i.e., Cyan dropout problem):**

1. From the main menu select Setup Menu.
2. From the Setup Menu select Ink Option Menu.
3. From the Ink Option Menu select Ink PreHeat Menu.
4. From the Ink PreHeat Menu select Cyan - Preheat.
5. Press either Prev Option or Next Option until the value 0 (zero) is displayed.
6. Press OK to accept the selection and return to the Ink PreHeat Menu.
7. Reprint the image to verify problem has been corrected.

**NOTE 1:** When performing a firmware download it is important to reinitialize the printer (Refer to 'Printer Initialization'). Reinitializing the printer sets all user settings back to their default values. If the printer is not reinitialized then the preheat values will be altered when the firmware

is downloaded and can only be corrected with a reinitialization of the printer. The reinitialization can be performed prior to or immediately after a firmware download.

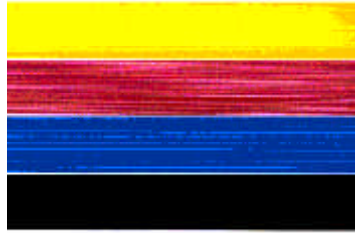


**Figure 4-62. Dirty Service Station Problem.**

**NOTE 2:** The symptoms of this problem could be easily confused with dirty service station, autowipe feature activation, servo motor failure or firmware related problems. Please verify by checking all ‘Microbanding’ and ‘Horizontal banding’ causes first.

## Color Test Problems

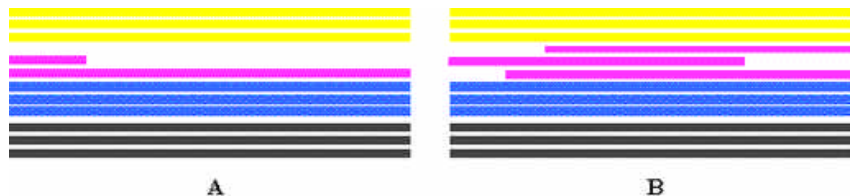
Symptom: After initiating the Color Test in a 2 pass mode one or more of the printed colors suffers ink starvation (Refer to ‘Ink Starvation’). If the starvation stops and starts as the color test progresses (i.e. the first swath starts to print then starves, the second swath prints and then also starves) then the cartridge most likely does not have enough ink inside (typically the cartridge should have between 15 and 30 ml of ink; cartridge ink level will eventually stabilize at 19 ml). Refer to ‘Cartridge Ink Level Check’. For all other color test printing failures please refer to the troubleshooting failure check below.



**Figure 4-63. Normal Color Test (3 Pass).**

**Normal Color Test.** Some microbanding or banding will be seen in the bar patterns – the purpose of the test is to check for ink pressure and not the quality of the printed pattern. Verify all bars print at 100% ink saturation.

Abnormal Color Tests:



**Figure 4-64. Abnormal Test Examples.**

A – Total ink starvation; recheck using the EasyPrime.

B – Partial ink starvation; check ink level in cartridge, ensure 20 ml installed using the syringe provided.

#### **Failure Analysis - Color Test Incorrect:**

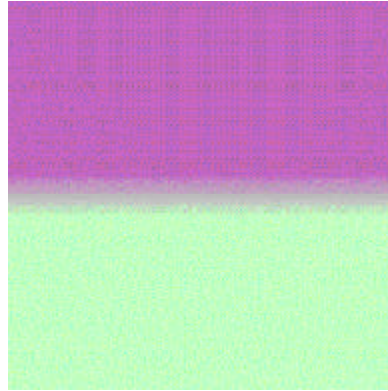
1. Ensure the cartridge is properly primed and pressure has been established inside the cartridge (see Set Up procedures) Note: when priming the cartridge it is important to ensure the suction end of the EasyPrime assembly is flush against the cartridge jet plate. Prime the cartridge using 3 consecutive one (1) second bursts and then wait 3-4 seconds, repeat 4-6 times over a 1 minute period. A sucking noise should be heard from the EasyPrime when procedure is performed correctly.

2. Ensure the reservoirs are attached to female valves properly at left end of printer or this may cause ink starvation in the ink delivery system after 10 minutes of print operations.



**Figure 4-65. Cartridge Tubing Needle and Septum.**

3. Ensure the septum connector assembly is tightly secure. The assembly is composed of three parts which must be tightly twisted together prior to installation and use.
4. Ensure the septum connector/cartridge tubing needle is properly connected between the cartridge and carriage assembly - you may have to reseal the assembly at the valve body. Replace reservoir tubing needle and/or cartridge tubing needle if pressure is lost after the procedure has been performed (a leak is present in the line).
5. Replace the cartridge with a new one. Re-prime the line.
6. If ink cannot be pulled through the line using the EasyPrime device ensure the device is functioning correctly by verifying suction and check the 4 AA batteries in the unit.
7. Always run a color test @100% in the 2 pass print mode to verify the proper pressure levels have been achieved within the cartridge.



**Figure 4-66. Ink Starvation.**

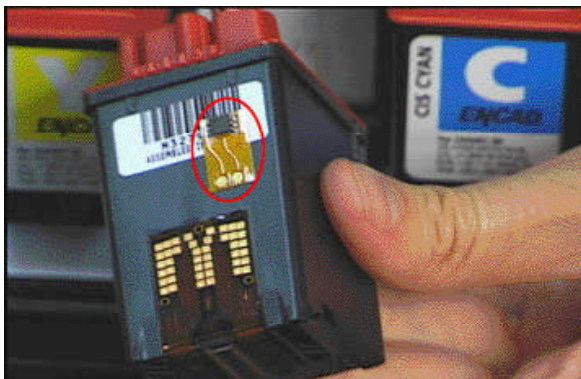
8. Refer to 'Ink Starvation' procedures for any printed output which resembles the following image where one color stops printing completely.

### **“Unrecognized Cartridge” Error Message**

For an 'Unrecognized Cartridge error' message first ensure the 2 electrical integrated chip contacts on the rear of the cartridge have been penetrated. Replace the cartridge to verify problem.

#### **Unrecognized Cartridge Failure Analysis Steps:**

1. Be sure the cartridge is the correct cartridge for your printer model. Your printer will not work with cartridges from other models. Remember, the printer is reading the value programmed into the chip on the cartridge, it is not actually detecting the cartridge type. Replace the cartridge to verify a failure.
2. Check MSB version. Select Utility Menu - Service Menu - About. MB: 87-27-0. Where 87 or 88 indicates the 800 series printer model; 27 indicates the printer is an ENCAD model; 0 indicates printing is authorized. Any other number sequence indicates the Main PWA is programmed incorrectly. Replace Main PWA.



**Figure 4-67. Cartridge Identification Chip.**

3. It is possible the ID chip on the rear of the cartridge may have slipped from its original position. Verify the double dimples (2 small circles on flex cable) have been penetrated at or near the center of each circle. If not the chip is out of position or is not mating correctly within the carriage assembly. After correcting, reattach cartridge, message should clear automatically after selecting OK.
4. To clear the error, turn the printer off and then on again. Press Utility Menu/Service Menu/Cartridge Info to determine the cartridge for which the error message is displayed. The incorrectly registered cartridge will have two asterisks (\*) displayed. Press Utility Menu/Access Menu/Access Right to move the carriage assembly to the service position to allow replacement of the appropriate ink cartridge. Check to make sure you have the correct cartridge for your printer model installed in each position. Install new cartridges if necessary.
5. Reseat both large flat white trailing cables at the Main circuit board if the above steps do not work. Reseat both cables at the carriage PWA's. Reseat all flex driver cables at rear side of carriage PWA's.

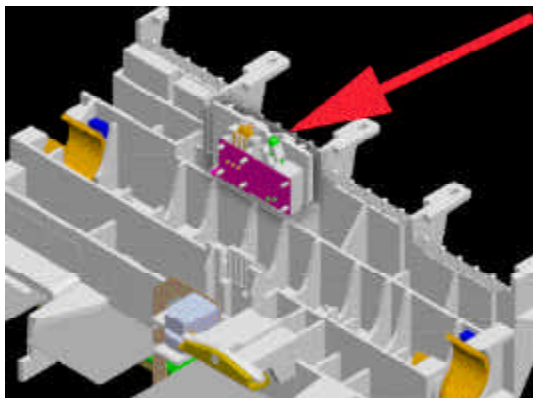


**Figure 4-68. Flex Driver Cable.**

6. Test dc voltage across the 2 IC (integrated circuit) identification dimples on carriage flex driver cable using a DVM (digital multimeter). In the DC scale verify that the voltage is jumping from 0 to +5Vdc. If the voltage is fairly steady at +5V then the respective carriage PWA is defective.
7. Replace both Trailing Cables.
8. Replace the Main PWA.
9. Refer to 'Cartridge Warranty'.

## **Paper Sensor Error**

The paper sensor error typically happens when a break in continuity occurs in the flexible printed circuit (FPC) line at the paper sensor assembly. The paper sensor assembly is the most fragile of the electronic components in the printer, exercise caution when installing or the assembly may break.



**Figure 4-69. Paper Sensor.**

### **Initialization Failure**

One symptom of a defective paper sensor is when the carriage assembly suddenly stops at left end of unit during initialization - initialization does not complete (dim or blank control panel display). This could also be due to a faulty power supply. The paper sensor should sense the platen on the return trip but may fail to do so - no error code given. Replace paper sensor PCB on carriage in this situation, unless the power supply is proven defective first.

NOTE: it is extremely important that the room or area lighting remains consistent during all print operations or the paper sensor may fail (often no error message is provided - the printer simply stops the print job; i.e., do not turn lights off in the room after a printer has successfully measured the media, and then start a print job).

Ensure the Main PWA LEDs (light emitting diodes) are properly functioning:

**D1** – Normally flashes; DSP is not active. Steady when printing.

**D9** – Normally flashes; Power PC processor is idle. Stops flashing when processor is active (i.e. during paper sensing operations).

**D10** – Normally OFF; Flashes during initialization, then turns off. LED staying on would indicate a problem when the FPGA is unconfigured. Ensures programming of gate array chips is successful.

**D8** - +24V available.

**D13** - +5V available.

**Loading Media Failure**

The carriage paper sensor (infrared sensor) will first obtain a reference at right side of media surface after load media is selected (or during autoload), then measure for media front edge detection (roll 1, roll 2, and sheet modes only), then measure media left edge detection second, then media right edge detection last. If the carriage stops at front edge, and the media rolls out in front of the printer continuously then the paper sensor is malfunctioning. This is probably due to ink covering the platen surface or the sensor optics, either on the LED (XMTR) or Sensor (RCVR). Clean the platen surface thoroughly or the sensor optics (located directly behind the right carriage magenta cartridge flex cable) or remove the carriage assemblies and replace the paper sensor.

**Failure Analysis:**

1. Ink on platen surface is typically the cause of sensing failures. Switch to take-up mode to verify failure. If take-up sensing is OK, then the platen is the problem. The platen may have ink on surface or the surface is damaged (tiny cuts in the painted surface exposing the shiny metal underneath)
2. Curl in media at left or right edge (vinyl/canvas exposed to high humidity). Certain types of translucent bond media cannot be detected properly.
3. Scratches or ink (dirt or debris) on platen surface. Often the printer suffers cuts in the painted surface from the use of a knife to cut media.
4. Buffed platen surface (some textile and heavy bond media is known to have caused this problem) which creates a shiny surface and interferes with normal sensor operation.

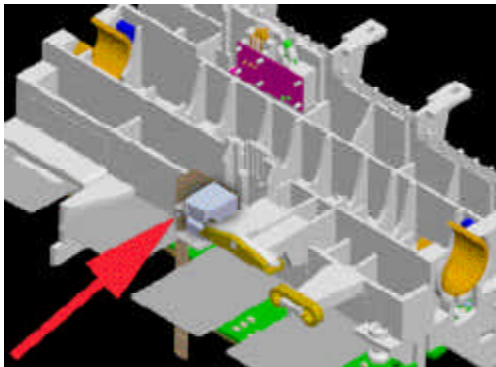


**Figure 4-70. Paper Sensor Location.**

5. Ink on Paper Sensor (most common failure).
6. Trailing cable connections (reseat/replace cable – outer cable).

## Encoder Sensor Error

The encoder sensor error typically happens when a break in continuity occurs in the flexible printed circuit (FPC) line at the encoder sensor assembly. The encoder sensor will need replacement should the error display. The encoder sensor assembly is connected to the carriage PCB at an angle and may be difficult to connect. During installation the connection must be secured or erratic carriage movement of the carriage assembly may occur at power up.



**Figure 4-71. Encoder Sensor.**

**Initialization Failure**

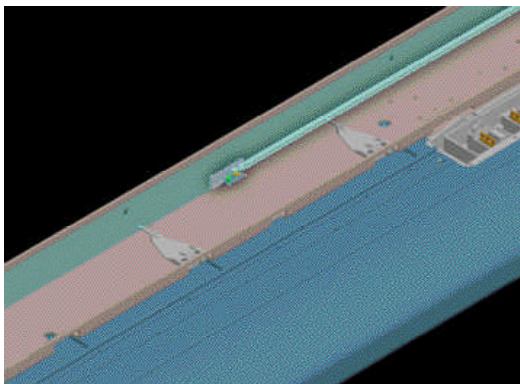
One symptom of a defective encoder sensor is when the carriage heads fail to move during printer initialization - initialization does not complete and a 'Carriage Axis Error' results. Replace paper sensor PWA on carriage in this situation, unless the servo motor or trailing cable is proven defective first. Another failure is characterized by erratic carriage movement at power up, this is usually an unseated connection at the right carriage PWA (offering the improper feedback to the servo system loop).

**Carriage Tracking Failure**

The infrared encoder sensor (on the right carriage) is responsible for reading the encoder strip lines and providing feedback to the gate array on the Main PWA and thus monitoring carriage position over 1000 times per second and is responsible for exact ink drop placement onto the media. The sensor uses binary counts to track carriage position along the encoder strip, 4 basic counts are used = 00, 01, 10, 11. There are 150 lines per inch along the encoder strip, so (4 x 150 =) 600 dpi resolution is achieved. However, home position is the left edge of media and should a miscount occur then the image will 'walk' or skew from its intended print position on each pass of the carriage head. Improper cleaning agents on the encoder strip can cause encoder strip pitting to occur and thus lead to miscounts. Encoder strips should be maintained in accordance with the Routine Maintenance. If the encoder strip is not maintained then the ink residue and air debris will transfer to the encoder strip causing it to fail. Symptoms include failure of the carriage assembly to move at power up (with 'Carriage Axis Error' displayed on the control panel display).

**AutoLoad Paper Sensor Error**

The Autoload-Paper sensor error only functions to pull media into the printer. Triggered by the front edge of the media with a 6 second delay, the sensor activates the stepper motor to drive the lower roller. Typically the autoload paper sensor does not fail, it becomes nonoperational due to ink covering Y-Arm surface or covering the LED (XMTR) or sensor (RCVR). Initially clean the Y-Arm surface below the sensor with a cotton swab or lint-free towel dampened with distilled water or isopropyl alcohol, then remove the sensor and clean.



**Figure 4-72. AutoLoad Paper Sensor.**

A symptom of failure includes when media is loaded and the printer rejects the media and spits it out the rear of the printer. First ensure the entire platen surface has been thoroughly cleaned using distilled water on a lint-free cloth. One quick solution for this problem is to loosen the two securing screws and change the pitch or angle of the sensor to the media surface. The second solution involves cleaning of the Y-Arm surface or optic infrared sensors.

## **Carriage Axis Error**

A ‘carriage axis error’ is the most common error observed on the printer and is typically caused by an obstruction or an electronic hindrance of the carriage assembly during travel. Causes of failure include the slide shaft, encoder strip, trailing cable, outrigger carriage cover bushings, left or right carriage bushings, cutter, servo motor, service station, carriage belt, frame tensioner, and spring. Typically the outrigger bushings are clogged with debris causing the error condition. Remove and clean.

### **Carriage Axis Failure**

The carriage stops suddenly during initialization or during normal printing. ‘Carriage Axis Failure’ is displayed on control panel display.

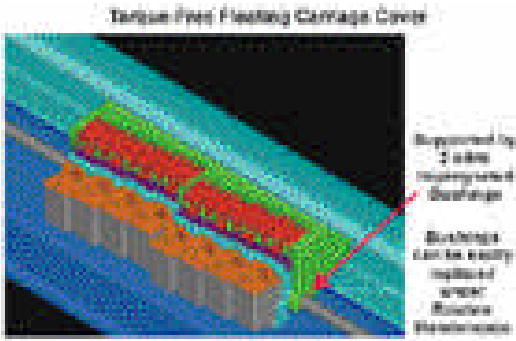


Figure 4-73. Carriage Head Assembly.

Carriage Test

Perform a Servo Cycle Test (10 cycles is sufficient) to verify carriage bushings are defective. Ensure Halt time does not exceed 90. Left to Right resistances are normally higher than Right to Left due to carriage heads pushing against ink delivery chain. Acceleration is also higher than Slew or Deceleration values.

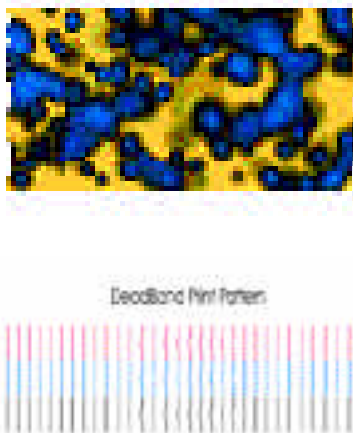
PWM	Left to Right				Right to Left		
	Acc	Slew	Decel		Acc	Slew	Decel
Max	42	54	8		7	3	2
Max2	11	12	8		2	1	8
Min	0	0	0		0	0	0
Avg	16	4	0		0	0	0
Set = 20		Halt Times 4		Cycle = 1/4			
Note: Go end up for Halt Time checks until a close fail elude							
Hgt - how many milliseconds to exceed the current in the coil							

Figure 4-74. Servo Cycle/PWM Menu.

If Halt Time is above 60 excessive drag exists on the carriage assemblies and the servo motor may be defective or the carriage bushings may be severely worn. At approximately 98, a 'Carriage Axis Error' will result. Push the carriage to the left end of printing area. Power the printer on, carriage head should return to station and size the media without error.

### Failure Analysis

1. Is the Encoder Strip clean? Has any image skewing occurred prior to the carriage axis error? If skewing resumes following a cleaning within a day or two then the encoder strip is damaged and must be replaced. Normally the encoder strip cleanings should carry the unit through 7 day/24 hour operation for a minimum of 2 weeks without error. Refer to disassembly to replace the encoder stabilizer bracket and the trailing cables.

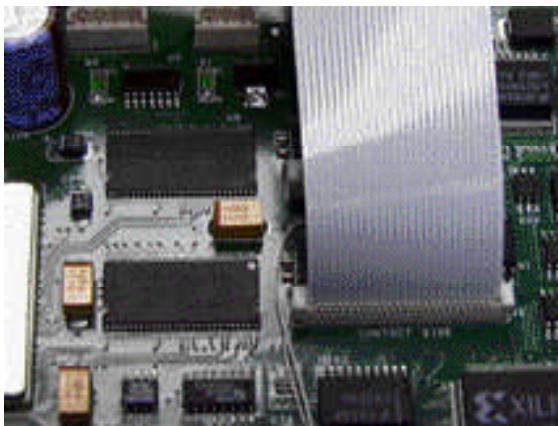


**Figure 4-75. Dirty or Defective Encoder Strip.**

Inspect encoder strip for damage - if error occurs in one spot consistently then the encoder strip could be damaged. Replace the stabilizer bracket (encoder strip is pre-attached to stabilizer bracket) and obtain a new trailing cable assembly for installation.

2. Check outrigger carriage cover bushings for visible wear and replace outrigger bushings at 400 hours of printing operation. To replace the cover bushings refer to disassembly procedures. While replacing inspect and verify the internal right and left carriage bushings are not severely worn (normally replaced at 2000 plot hours).
3. Is the Slide Shaft clean? Check with printer operator to see if lubricants have been applied to slide shaft - no lubricants should be applied to any part of the printer.

4. Is the Media Cutter malfunctioning? Remove the cutter and service station to ensure the assemblies are not inhibiting carriage assembly travel. Also ensure the cutter groove is free of debris.
5. Is the Carriage Belt tight? Is the carriage belt frayed? Check the frame tensioner and idler for damage - ensure tension is tight on belt and not loose. Clean inside of carriage belt with isopropyl alcohol (greater than 70% alcohol only!). Ensure carriage belt is installed properly with the idler (wheel) installed right-side up. Also, the block on the carriage belt should be aligned to the right carriage assembly studs or a vertical line may show in the prints. Refer to 'Carriage Assembly' removal procedure.
6. Is the Frame tensioner attached properly/broken? Ensure the ink delivery system electronics cover is attached to the carriage assembly properly and is not rubbing against the rear support bracket (rear white cover). Power unit off and slide back and forth to test this. Does the carriage assembly move back and forth freely without hitting any obstacles (including the pinch roller assemblies)?
7. Run the Servo Cycle Test (set for 100 cycles) under the Diagnostics Menu; if the tests were successful then check the firmware version. If the carriage assembly moves only 1- 3" (2 to 8 cm) from the home position at power up then the servo motor is most likely defective. Also, see step 10 below.
8. Power off the printer, move the carriage assembly to extreme left-hand side of unit. Power on the printer. If the carriage returns to the service station on the first pass then the trailing cables (large flat white cable) are probably good. But if a 'carriage axis error' occurs the faster return pass then first suspect worn carriage cover bushings, then check internal right and left carriage bushings. Replace bushings (4 total) as required; verify shims are in good condition. Replace shims if necessary.



**Figure 4-76. Main PWA Trailing Cable Connection.**

9. For erratic carriage movement at power up reseal the trailing cables and encoder sensor cable connections at the right carriage PWA. Reseat trailing cables at the Main PWA jacks. Ensure all ZIF (zero insertion force) connections are locked.
10. Verify servo motor resistance values with an ohmmeter or multimeter. The resistance should be 2-8 ohms (1.5 to 30 ohms is acceptable). Replace servo motor if values are out of tolerance. Measure brush resistance across servo motor windings to verify a short does not exist - replace servo motor if new trailing cable does not fix carriage axis error. There is no way to verify faulty bearings other than grinding when the shaft is turned. The typical motor will last approximately 2800 plot hours (2.8 million servo cycles). The brushes or bearings may fail. Replace motor at 4000 plot hours in accordance with prescribed routine maintenance.
11. Check slide shaft profile/carriage head height adjustment; verify/perform both alignments. Refer to alignments. A severely bent slide shaft (upwards) or low carriage head height can cause carriage axis failures or head strike.
12. Replace trailing cables assembly. Refer to disassembly.
13. Replace servo motor if carriage head advances only a few inches

or less at power up and results with a 'carriage axis error' or if operation is intermittent with failures. Servo motor power can be checked by assisting carriage head movement with one hand (gently help push the carriage assembly along; if successful, the servo motor is defective. Refer to disassembly.

14. Replace encoder sensor if the encoder strip was noted as being extremely dirty and/or carriage head does not move at all during printer power up. Refer to disassembly.
15. Replace the right carriage PWA (defective encoder sensor jack or trailing cable jack). Refer to disassembly.

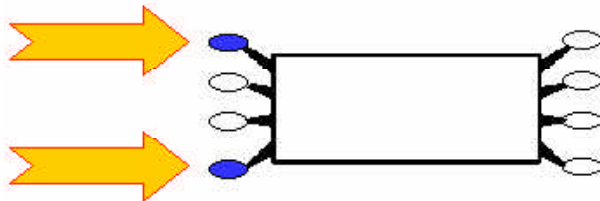
## Initialization Failure

**SYMPTOM:** PRINTER DOES NOT INITIALIZE AFTER THE POWER SWITCH IS TURNED ON.

Note: there is no carriage head movement for the failure analysis below. If there is carriage movement prior to the initialization failure then please refer to 'Carriage Axis Failure' troubleshooting procedures.

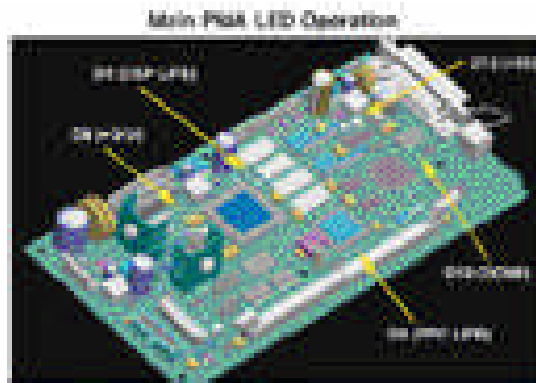
### Failure Analysis:

1. Ensure the power source from wall outlet or power strip is good.



**Figure 4-77. Boot ROM Access Function.**

2. While holding the top-left and bottom-left keypad switches, turn on the power switch. A "double beeping" should be heard from printer. This will verify the initialization code (BootROM) is running properly; printer is in a continuous run state. Reseat all cable connections if this test fails, then repeat step again. Download BootROM and Firmware in this configuration. Power off printer, wait 10 seconds, reapply power to printer. Check operations.



**Figure 4-78. Main PWA LED Operation.**

Ensure Main PWA LEDs (light emitting diodes) are properly functioning:

**D1** – Normally flashes; DSP is not active. Steady during print operations.

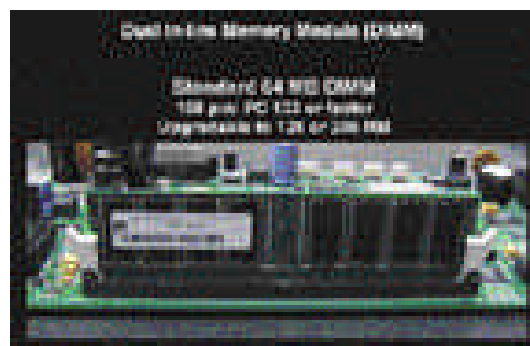
**D9** – Normally flashes; Power PC processor is idle. Stops flashing when processor is active (i.e. during paper sensing operations).

**D10** – Normally OFF; Flashes during initialization, then turns off. LED staying on would indicate a problem when the FPGA is unconfigured.

Ensures the gate array chips have been properly programmed (one on Main PWA and on each Carriage PWA).

**D8** - +24V available.

**D13** - +5V available.



**Figure 4-79. Memory Module.**

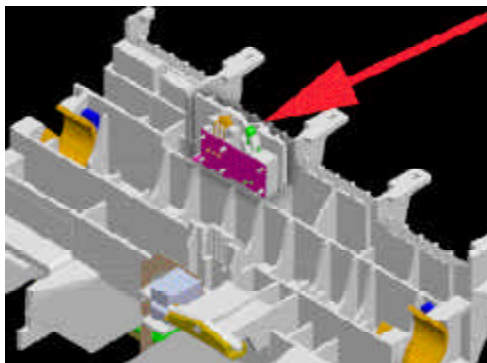
3. Remove power from the printer. Ensure the memory module (DIMM - dual-in-line memory module) at the Main PWA is seated properly. There must be installed memory for the printer to initialize. The top and right cover assemblies must be removed to access the Main PWA (remove 5 screws to gain access). Replace the memory module to verify memory is not the cause of failure. Refer to disassembly.
4. Refresh the printer firmware during the cyclical “two-beep” sequence from step 2 above if successful. Cycle power and retest. Call technical support if unfamiliar with this procedure.
5. Check the AC power entry module continuity and switch operation. Ensure plug between power supply and power entry module is intact and connected properly. Caution: even with the power switch in the off position AC power is still being applied to the dryer plenum. Refer to Disassembly.
6. Verify the fuse at the Power supply is good (0.5 ohms or less). Verify the wire plugs at power supply jack on the Main PWA are properly connected with the plug. Retest.
7. Check power supply output voltages to Main PWA using a digital voltmeter or hand held voltage meter. Select DC measuring scale.

Ensure Main PWA LEDs are displaying:

**D8** - +24V available.

**D13** - +5V available.

Replace the power supply if the +5VDC or +24VDC levels are absent from power supply output. Verify the power source is isolated prior to checking output and also check for grounding of +24VDC signal lines. If all voltages are absent replace the power supply. If only one voltage is absent then replace Power supply. Refer to Disassembly.



**Figure 4-80. Paper Sensor.**

8. If the carriage assembly suddenly stops at left end of unit during initialization - initialization does not complete (dim or blank control panel display), this could be the symptom of a defective paper sensor. This could also be due to a faulty power supply. The paper sensor should sense the platen on the return trip but may fail to do so - no error code given. Replace paper sensor on the right carriage in this situation, unless the power supply is proven defective first.
9. Disconnect the servo motor and stepper motor connections at Main PWA. Check for proper voltages with the various loads isolated. Replace motor as necessary. Refer to Disassembly.
10. Replace the memory module if not already performed. Refer to Disassembly.
11. Replace the Main PWA in all other cases. Refer to Disassembly.

## Media Sensor Reference Points Not Initialized

### Hardware Failures/Diagnostic Tests

#### Quick Troubleshooting List

1. Send a test image (PRT or RTL) directly to printer to verify a hardware failure.
2. If the carriage stops during normal travel clean encoder strip/slide shaft/bushing/belt; reseal trailing cable connections if necessary.
3. Check feed/take-up modes and operation. Run a legs test under Diagnostics.
4. Reseat all printer cable connections.
5. Refresh the printer firmware.



**Figure 4-81. Main PWA LED Operation.**

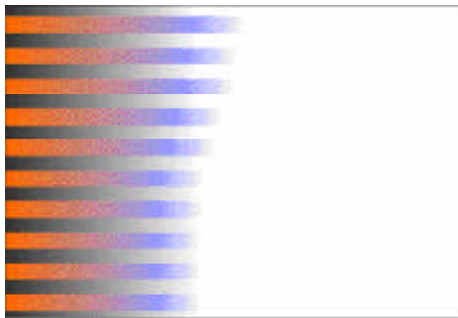
6. Check Main PCB LED's (light emitting diodes):
  - D1** – Normally flashes; DSP is not active. Steady during print operations.
  - D9** – Normally flashes; Power PC processor is idle. Stops flashing when processor is active (i.e. during paper sensing operations).
  - D10** – Normally OFF; Flashes during initialization, then turns off. LED staying on would indicate a problem when the FPGA is unconfigured. Ensures the gate array chips have been properly programmed (one on Main PWA and on each Carriage PWA).
  - D8** - +24V available.
  - D13** - +5V available.

7. Replace failed subassemblies.

### **Inconsistent Operations**

Reinitialize unit. Select Init Settings to re-initialize printer, 1 beep should sound.

### **Functional Problems**



**Figure 4-82. Functional Problem.**

Verify proper grounds from power source exist; plug both the computer and printer into the same electrical outlet for direct printing systems or non-networked environments.

### **Noise in Image**



**Figure 4-83. Connectivity Problem.**

Typically a bad parallel printer cable will cause noise to show up on the printed image, typically characterized by random lines extending horizontally from the printed output. Replace defective cable with an IEEE 1284 compliant parallel printer cable.

## ESD Problems



**Figure 4-84. ESD Problem.**

1. Intermittent Banding - jet failures.
2. OverSpray
3. Severe color loss in either 1x4 right or the 1x4 left print mode.

Verify media is not causing the problem. Change to a different media type.

## Dryer Failure/Sensor Error

From the top-level menu of the printer, check the sensor status.

Utility Menu  
Service Menu  
Diagnostic Menu  
Accessory Menu  
Sensor Status

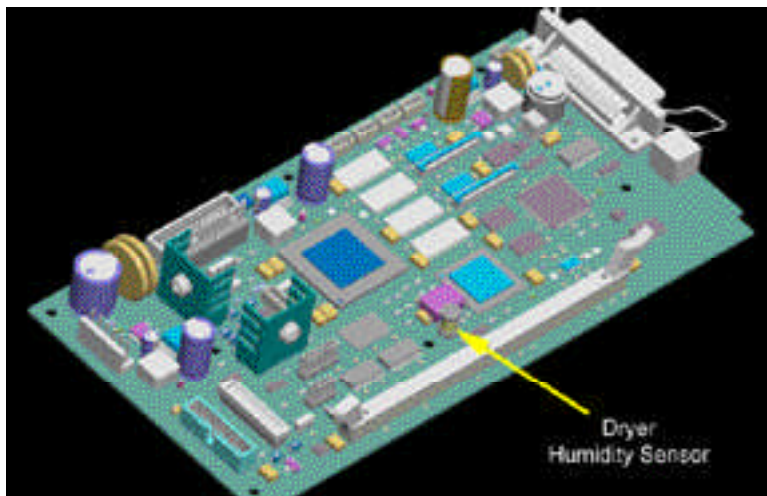
The printer LCD will display the following information:

*Dryer Mode: ccccccc*

*Plenum T. = ## deg. C*

*MBoard T. = ## deg. C*

*MBoard H. = ## pct. RH*



**Figure 4-85. Main PWA Humidity Sensor.**

The *Dryer Mode*: (ccccccc) indicates the current dryer setting. Operational modes are “OFF”, “ON”, “AUTO”, or “DISABLED”. *Plenum T.* and *MBoard T.* (main-board T.) indicate temperature and are displayed in degrees C. *MBoard H.* (main-board humidity) indicates the ambient relative humidity as a percentage.

If the dryer mode is set to “AUTO” and the firmware times-out trying to read the *MBoard T.* or the *MBoard H.*, a “\*” character will appear after *Dryer Mode: ON* to indicate that the dryer mode was automatically switched from “AUTO” to “ON”.

The power supply fan is turned on immediately upon menu selection. One of its jobs is to feed ambient air into the main board chamber where the sensors reside. The main-board sensors require several minutes (approximately 5) of this of exposure to the ambient air before they can adjust to room conditions. If the printer has been turned off or has been idle for several minutes, validation for sensor accuracy must be made after this adjustment period has elapsed.

Information on this display is updated once every five seconds. Please wait for this time period to elapse before evaluating test results. If the

firmware is unable to read the plenum temperature, main-board temperature, or main-board humidity, the corresponding equals sign (=) will change to a tilde (~). This error condition signifies an internal bus communication failure only. It does not indicate sensor connection or performance errors.

The *Dryer Mode:* and *Plenum T.* items will also modify their display if a dryer component or main-board sensor error is detected. If the dryer circuit board detects an over-temperature condition or if it is disconnected from the printer, *Dryer Mode:* will indicate “DISABLED” and *Plenum T.* will indicate “(Hdw. Fault)”. The dryer firmware will shut down the dryer by switching to “OFF” mode, turning the heater power off and turning the fans on automatically. The dryer circuit board will react in a similar fashion by switching to its own “shutdown mode” which turns the heater power off and turns the fans on automatically. This duplicate reaction by hardware is provided in the case where the firmware has lost control. The dryer will remain in this “shutdown” state until power is recycled.

If the firmware detects a *Plenum T.* sensor error, *Dryer Mode:* will display “DISABLED” and *Plenum T.* will display “(T. Error)”. This error can occur if the plenum temperature falls below –10 degrees C or if the firmware is unable to read the plenum temperature for one minute or longer. Typically, a negative temperature indicates a broken connection in the thermistor-to-main-board connection. If unable to read the temperature, the firmware is receiving bad data from the Dallas Bus. The dryer firmware will shut down the dryer by switching to “OFF” mode, turning the heater power off and turning the fans on automatically. The dryer will remain in this “shutdown” state until power is recycled.

Additional information will be displayed if the “F6” panel button is selected (second button down on the right side of control panel) and held down. If *Dryer Mode:* displays “OFF”, “ON”, or “AUTO”, the target heater temperature will be displayed (in degrees C). In addition, if the heater power is on, a “^” character will also be displayed. If *Dryer Mode:* displays “DISABLED”, the error temperature will be displayed on the *Plenum T.* line immediately after either “(Hdw. Fault)” or “(T. Error)”. This error temperature value indicates the plenum thermister

reading that was sampled when the detected error occurred.

### **Failure Analysis**

1. Ensure all logic cable and power cable connections are intact.
2. Check lower leg harness cable plug connections between right stand leg and platen plug, and connection between upper leg harness cable and Main PWA. Perform electrical pin-out to verify continuity of cables (refer to service manual). Typically for wiring harness and dryer logic cable problems the Dryer will be forced into the Disabled mode and Plenum Temperature (Plenum T) will change to approx. -43C and display a Hardware Fault (Hdw. Fault).
3. Replace the Main PWA (the humidity sensor and temperature I/C are attached to backside of Main PWA). Refer to Disassembly.
4. Replace the Dryer Assembly.

**Note:** There is a particular sequence of events that could result in a disabled dryer. Please be aware that this condition could occur and is recoverable. The dryer and printer are operating as designed. The sequence of events are:

1. The Printer has been on and DRYER ON or AUTO for some period of time.
2. The printer is turned OFF.
3. The printer is immediately turned ON.
4. As the Firmware is being initialized power is applied to already warm heating elements.
5. The temperature in the plenum rises to the Firmware shutoff point but since the Firmware is still initializing no action can be taken.
6. The temperature in the plenum triggers a hardware shutdown (the electronics shuts down power to the heating elements and the fans are forced on).



## Intermittent Problems/Continuity

If the printer experiences intermittent print problems or reboots then ensure all connections at Main PWA are good, platen is thoroughly cleaned of ink, verify the DIMM module is seated correctly and check for foreign debris in rollers.

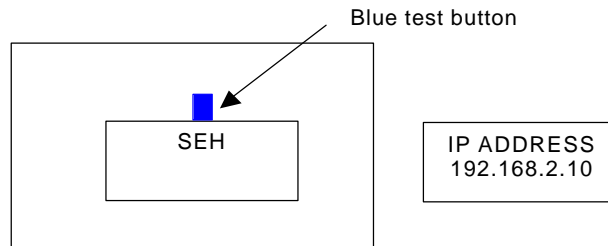
### Failure Analysis

1. Reinitialize the printer. From the Main Menu select Setup Menu, then select User Setup Menu, and choose Init Settings. The unit will sound one beep indicating the refresh was successful and all user settings have been restored to default. Refer to the 'Printer Reinitialization' procedure.



**Figure 4-88. Internal Test Print.**

2. Perform the test print (Utility Menu – Service Menu – Test Print). Ensure the printer is in the highest print pass mode before printing. Five pass for 2x4 cartridge set, or 10 pass for 1x4 or 1x8 cartridge sets. Verify a similar output to this example is printed. The test print is used to verify printer calibrations.
3. Refresh the printer firmware. Refer to the 'Firmware Download' procedure. To test the SEH server and connectivity, depress the SEH's blue test button. The currently configured IP address will be displayed in the printer's control panel display.



**Figure 4-89. SEH Activated Test Pattern.**



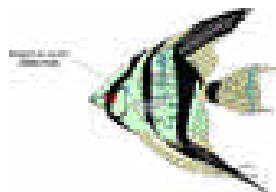
**Figure 4-90. E-Connect LEDs.**

4. For data or communications problems to the printer check parallel port interface by running a E-Connect Test (quickly depress Test Button at rear of printer at E-Connect Box) or run a continuous test with loopback cable attached (not provided with printer). Refer to the 'Parallel Port Test'. The Semi-Circular Nook test pattern will print. This will ensure the network server, parallel printer ports, the short parallel printer cable (15"/39 cm), and the Main PWA processor are functioning correctly.

NOTE: The yellow (100) LED should be illuminated indicating a 100baseT network is online. As long as the green LED is illuminated printer operations should be successful.



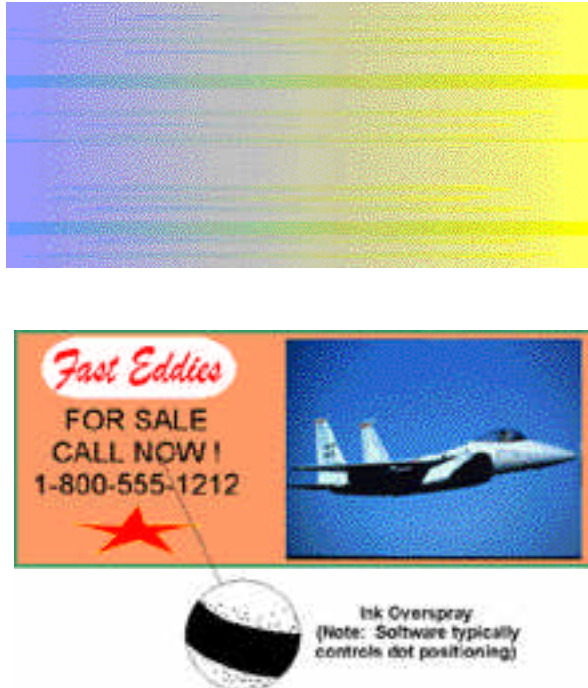
**Figure 4-91. Driver/RIP Problem.**



**Figure 4-92. Inadequate Network Data Transfer Rate.**

5. Check with the RIP or Print Driver vendor for the latest software upgrades to ensure no conflicts exist with currently loaded firmware. To check current firmware version from Main Menu select Utility Menu, select Service Menu, select About. The display will indicate the firmware version as follows:  
MB: xx-27-0  
where:  
xx is the model type  
27 indicates the printer is an ENCAD model  
0 indicates that printing is authorized.

Refer to the 'Checking Firmware' procedure.



**Figure 4-93. ESD Problems.**

6. Ensure media does not generate large amounts of electrostatic discharge as this may interfere with normal printing operations including microbanding, over-spray, and ink drop out. Add 3<sup>rd</sup> party ESD protection (static eliminator strip).
7. Reseat the memory module (DIMM) at the Main circuit board.  
Power off printer.

PWM	Left to Right				Right to Left		
	Acc	Time	Detail		Acc	Time	Detail
Max	62	54	8		7	8	2
Mean	11	12	0		2	1	0
Min	0	0	0		0	0	0
Avg	18	4	0		0	0	0
Sec = 28			Halt Times = 4		Cycle = 34		
Note: 60 and up for Halt Time means unit is close to failure							
Halt - how many milliseconds it took the unit to halt							

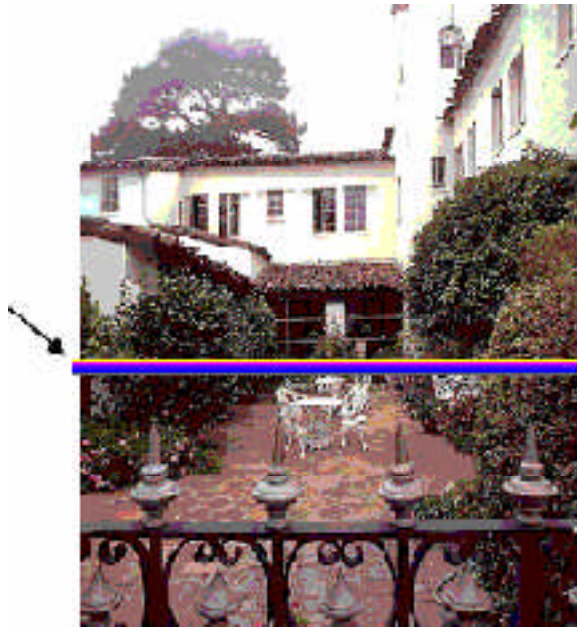
**Figure 4-94. Servo Cycle/PWM Menu.**

8. Run the PWM test (3 default cycles) or Servo Cycle test (set for 100 cycles) under Diagnostics; if the tests were successful (without error or Halt time does not exceed 60) then check the firmware version. If the carriage assembly moves only 1- 3" (2 to 8 cm) from the home position at power up, resulting in a 'Carriage Axis Error' (occurs @ value 98), then the servo motor is most likely defective. Also, see step 10 below.



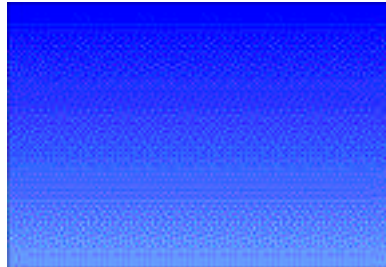
**Figure 4-95. Carriage Bushings.**

9. Power off printer, move carriage assembly to extreme left-hand side of unit. Power on printer. If the carriage returns to the service station on the first pass then the trailing cable (large flat white cable) is probably good - suspect worn outrigger bushings (2 total) or internal carriage bushings (4 total). Refer to Disassembly.
10. For erratic carriage movement at power up reseal the trailing cable and encoder sensor cable connections at the Right carriage PWA. Reseat inner trailing cable connection at the Main PWA. Ensure all ZIF (zero insertion force connections are locked securely).

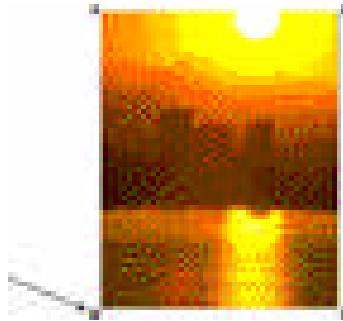


**Figure 4-96. Servo System Synchronization Error.**

11. Verify the servo motor resistance values with an ohmmeter or multimeter - should be 2-8 ohms (1.5-30 ohms acceptable). Replace servo motor if values are out of tolerance. Check outrigger bushings followed by the carriage bushings.
12. Replace trailing cable assembly.



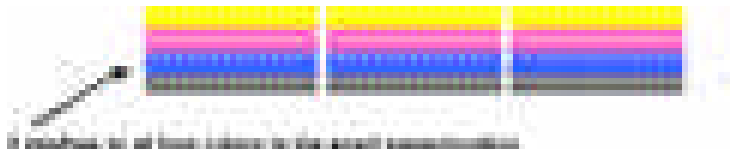
**Figure 4-97. Probable Defective Main PWA.**



**Figure 4-98. Probable Defective Carriage PWA.**

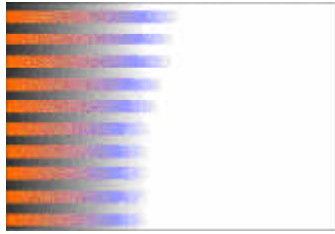
13. For inconsistent color output (color changes randomly or changes slowly down the print within the same color space), color print failures in all colors or prints, or no color print output then replace the appropriate carriage assembly (defective gate array I/C or driver I/C most likely). Ensure the 1x4 right and 1x4 left cartridge sets are utilized for isolating the defective carriage PWA. If problem shows up in both modes then the Main PWA or firmware is at fault. Both examples above are extremely rare.

**NOTE:** Do not replace electronic assemblies for microbanding symptoms. Normally the printer calibrations, select print mode, or cartridge failure causes 97% of the symptoms observed.

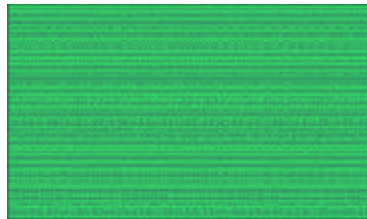


**Figure 4-99. Defective Main PWA.**

14. For specific test or calibration functions that fail to print or execute replace the Main PWA. Caution: do not use magnetic tipped screwdrivers around circuit assemblies as this is known to have caused Main PWA failures in the equipment. Refer to 'Main PWA' removal procedures in DISASSEMBLY.



**Figure 4-100. Corrupted Code - Main PWA.**



**Figure 4-101. Microbanding.**

**15. Corrupted Flash ROM**

First reload Firmware (direct connect a PC via a 6 foot/2 meter IEEE 1284 compliant parallel printer cable), then reload Boot Code, and finally replace the Main PWA (to check the Flash ROM) for the following problems if issue cannot be solved by any other means:

Horizontal banding (1 cm spacing)

Microbanding (.5 to 2mm banding)

16. For printers which cease printing during overnight print runs ensure the room lights remain on (or is consistent from the time media was measured) as this may affect paper sensor performance leading to incomplete print jobs.
17. For O/R Error Messages ensure both L and R values indicate numerical ranges of ...107800 through ..1082000. Any other numerical range could indicate a failure of the respective carriage PWA. A target range is typically displayed as P10.800; indicating the target cartridge drive voltage for this PWA is 10.8 vdc.



**Figure 4-102. Apparent Ink Overspray.**



**Figure 4-103. True Type Font Problem.**

18. For ink overspray or rough appearance of text edges ensure Adobe fonts are being used and that embedded text is not scaled via a compression plug-in.



**Figure 4-104. Print Settings Not Printing in Black.**

19. If the print settings are printed in any color other than black (normal) then the **right** carriage PWA is defective.



**Figure 4-105. Text Field Problem.**

20. Diagonal banding within text or lines adjacent to text indicates a text field problem.



**Figure 4-106. Dirty or Defective Encoder Strip.**

21. If color deadband appears correct on both edges of the printer but is off at the center then the encoder strip is either dirty or defective.

## **Reinitializing the Printer**

To reinitialize the printer select User Menu - User Setup Menu - Init Settings. A single beep will sound indicating all printer settings have been returned to the printer defaults.

Always perform a reinitialization (Init Settings) after conducting a firm-ware download. This will ensure the cartridge print head preheat settings have been reset to default.

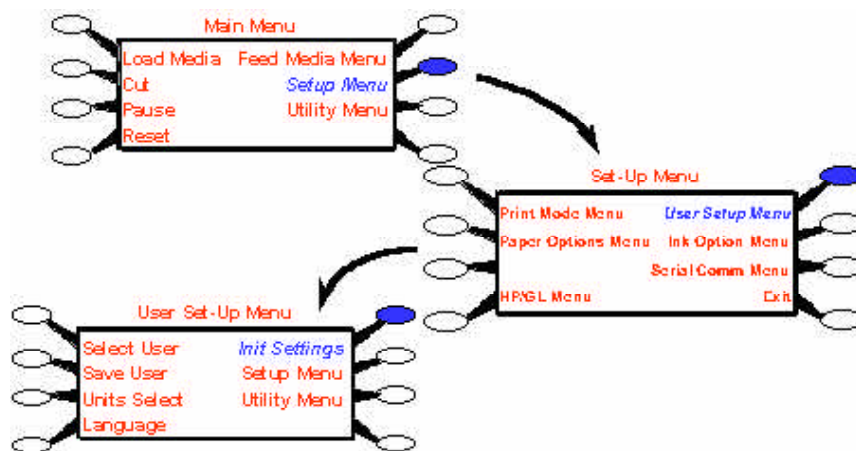


Figure 4-107. Initialization Menu Location.

## Printer Hesitation/Networking Problems

Hesitation of the printer carriage is normally caused by the parallel port data rate not being optimized. Ensure the ECP parallel port mode is utilized, or better, network the printer.

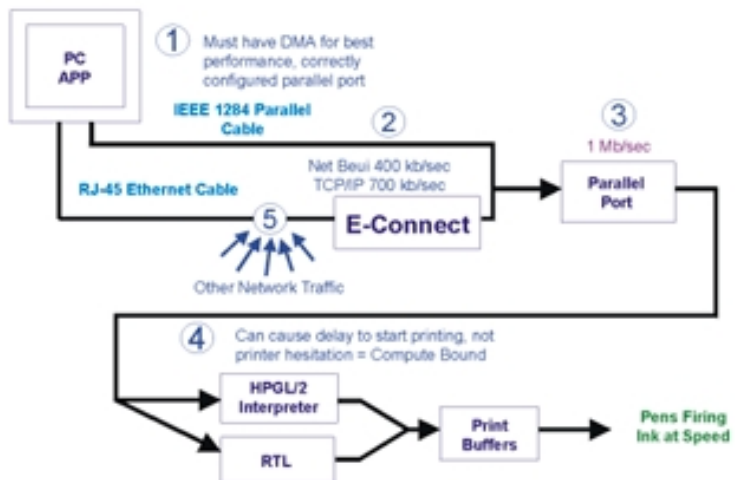
### Data Starvation

'Data Starvation' normally occurs when the printer has to wait for additional data from the host computer to complete another print pass. This phenomenon is due to data not being transferred fast enough from the host computer. Several junctions between the computer and the printer can affect the data transfer rate. Most common causes of data starvation:

- Computer CPU may be too slow; less than a 450 MHz processor
- Operating System complexity.
- Hard drive space; non-partitioned drive (affects 'RIPping' performance)
- Driver sending file may be too slow (must use high speed driver setting)
- RAM on host workstation is insufficient (typically 256 MB is suggested)
- Non-IEEE 1284 compliant parallel printer cable used (for non-net-

worked environments)

- E-Connect is improperly configured for high data transfer rate; redundant protocols turned on (900 kbyte optimum data rate normally required)
- Network has high traffic (limit workstations on server)
- Computer parallel port mode not set to ECP with DMA (for non-networked printing). For NT systems suggest using a unique PCI card to ensure a 1 MB per second data transfer rate.



## Causes of Printer Hesitation

**Figure 4-108. Printer Hesitation Causes.**

### Compute Bound

When the printer becomes 'compute bound', the print head will hesitate between print passes. This occurs when the printer's processor cannot keep up with the print swath requirement; could occur normally in the one or two pass print modes. In the one or two pass print modes all the ink is fired in one pass or two passes to complete a print swath. Since a large amount of data has to be computed to complete that swath, the print head may have to wait between swaths and depending on the amount of memory in the printer (i.e. for a plot file stored in memory) the printer may have to wait for all instructions to be processed before printing each pass.

Suggest increasing memory to 256 MB for low pass print mode operations. Typically this only affects CAD (computer aided design) users that send HP-GL/2 files (vector) to the printer. File format examples include .plt and hp2.

### **Miscellaneous Notes**

Note: NT does not support ECP parallel port mode, an additional parallel port (PCI card) must be installed or a configuration with a network and print server is suggested. Also turn off the Video ROM shadow in the BIOS as this can cause a 20% overhead on the CPU. Verify the Windows Screen Saver is always turned off as this may cause hesitation as well. Another tip is to RIP to disk or print to file and then send the file via the EFPU3.0 (ENCAD File Print Utility version 3.0) to see if this eliminates the hesitation. For hesitation associated with only vector files, such as plot or hp2 files, the problem could be insufficient memory. Increase printer memory from 64MB to 256MB.

To prove printer performance select the Pause feature, and wait 20 to 30 seconds before de-selecting Pause. If printer is working properly the carriage head should stop hesitating and production performance should increase for a short period of time.

### **Network Connectivity**

The printer comes with a built-in 100BaseT network board which interfaces via two cables, an SEH server, or an onboard, built-in Ethernet port. If you are using the E-Connect (NJ850 only, then attach the provided parallel printer cable (15"/39 cm) between the upper centronics parallel port and the lower parallel port at right rear of printer. Attach an Ethernet cable to the E-connect jack. Verify the green LED (OK) illuminates. The green LED (OK) indicates the server is communicating with the network.

The white LED (TEST) should illuminate (amber in color) briefly only at power up and then extinguish. The yellow LED (100) indicates a 100baseT network exists and is online. E-Connect supports high speed ECP (enhanced capabilities port) parallel port mode with DMA (dynamic memory access) and Bi-directional data transfer up to 1 Megabytes per second. A short (15" or 39 cm) IEEE 1284 compliant parallel cable must

be connected between the upper parallel centronics port and the lower (network box) parallel port.



Figure 4-109. E-Connect LEDs.



Figure 4-110. Semi-Circular Nook Test Pattern.

**To activate an E-Connect TEST:**

Quickly depress the test key with a pen tip or other small blunt tool. DO NOT DEPRESS LONGER THAN 2 SECONDS AS THIS WILL CHANGE THE SERVER CONFIGURATION. The printer will print a Semi-Circular Nook test pattern which will verify the E-Connect print server network box and parallel ports are working properly.

## Parallel Port Test

Attach the service loopback test cable to the printer's parallel port (contact ENCAD Technical Support to obtain). Activate the 'Continuous Test' by selecting the Utility Menu, Service Menu, Diagnostics Menu, Continuous Test. The printer will activate several test patterns, the "parallel port test equals passed" should be printed. If successful then the parallel port is operating correctly.

**Caution:** Connecting a parallel printer cable to a printer that is turned on can cause damage to the printer. U9/U17/U22 buffer I/C's on the Main PWA are subject to failure when power arcs across the parallel pins. Always turn printer off before connecting a parallel printer cable or switching an A/B parallel connection switch from one printer to another.

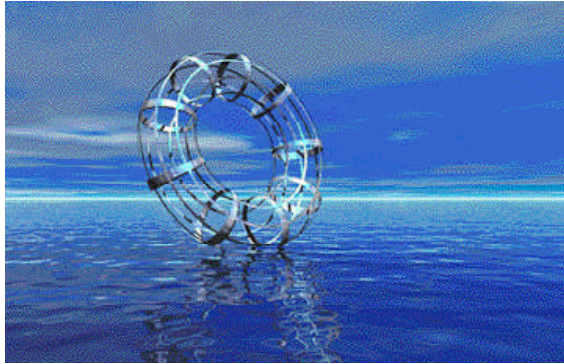


**Figure 4-111. Loopback Test Cable.**

Please contact ENCAD technical support for the loopback test cable (The loopback test cable is a short test cable which has a centronics port on one end and a mini-din connector on the other). Connect cable to parallel port only. Disregard the Serial Port test as this is only for manufacturer testing. Power printer off and disconnect loopback cable, wait 10 seconds, apply power. Also refer to the 'Intermittent Problems/Continuity' procedure.

### Other port testing procedures

1. Perform a follow up test print using a known good file. Obtain test file from the Servicing Support CD (*service item only*). File must be sent through the EFPV 3.0 (Encad File Print Utility).



**Figure 4-112. Demo Print.**

2. Refresh printer firmware. Refer to the 'Firmware Download' procedure.

## **Firmware Downloading Procedures**

### **NJ850 Printer**

1. Power on the printer. Verify current firmware version on printer to see if a firmware upgrade is necessary. Select Utility Menu, Service Menu, About - firmware version and boot code versions will be displayed.
2. Power off printer and directly connect an IEEE 1284 compliant parallel printer cable to the PC workstation and the printer.
3. Download firmware files into the same file directory. They can be found on the Encad web site, [www.encad.com](http://www.encad.com).
4. Power on the printer.
5. If your printer is set up using a printer server, you can use the ENCAD File Print Utility (EFPU) to download the new firmware to your printer. The EFPU can be found on the System CD or downloaded from Encad's website, [www.encad.com](http://www.encad.com).
6. Using the EFPU, send the XXXX.ROM file to the printer. Open the EFPU and press the **Add** button in the Folders section

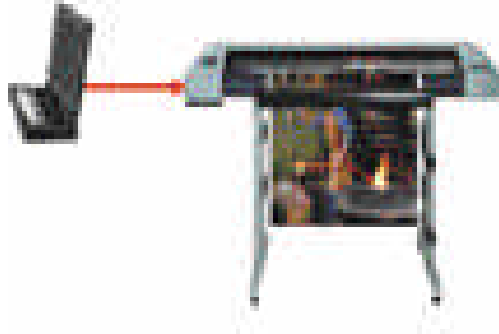
of the dialog box. Give the new folder a name and press **OK**.

7. Now press the **Add** button in the Files section of the dialog box. Find the firmware file that you downloaded from Encad's website and press the **Open** button. This will add the firmware file to the folder you created.
8. Select the firmware file in the Files section of the dialog box and press the **Print** button.

The firmware file is sent to the printer as a normal print job. Approximately 20 - 40 seconds later a single beep should be heard indicating the update was successful. After a one second delay, the printer will automatically reboot. The printer should come up normally. Verify the new firmware revision by sequencing through Utility Menu/Service Menu/About Menu. If multiple beeps are heard, reboot printer and reseal your connection to the printer (network cable or parallel cable). Resend the firmware file to the printer.

**Note:** the parallel cable should not exceed 6 feet or 2 meters. NT workstations do not support the required ECP parallel port mode unless a PCI card has been installed and configured for ECP parallel port data transfer.

**Caution:** Turn off printer before connecting the IEEE 1284 compliant parallel printer cable to printer or damage to Printer's Main circuit board may result !



**Figure 4-113. Firmware Download Procedures.**

### **NJ880 Printer**

1. Place printer into continuous run mode (two-beep sequence) by holding down the top-left and the bottom-left keys on the keypad and powering on the printer until the two-beep sequence is heard after approximately 6 seconds.
2. Perform steps as listed for the NJ850.

### **Expanded Instructions for Firmware Download/Upgrade**

1. Ensure customer wishes to upgrade to select firmware version. All new printers or Main PWAs are shipped with the latest firmware installed. Some functionality is usually gained with each successive firmware version.
2. Use an IEEE 1284 compliant parallel printer cable for the download from a PC (via the ECP parallel port).
3. Power off printer first or damage may occur to printers Main PCB (U9/U17/U22 buffer IC's). Connect an IEEE 1284 compliant parallel printer cable (6 feet/2 meters in length or less is preferred, 10 feet/3 meters is suggested) to printer's parallel port.
4. Obtain the firmware file: xxxxxx.EXE (firmware)  
Copy to hard drive. Double click on .exe file at explorer/winfile to extract 3 files.

**INTERNET:****<http://www.encad.com> (Downloads - Software)**

5. Extract 2 files from the executable: xxxxxx.rom, and readme.txt.
6. If your printer is set up using a printer server, you can use the ENCAD File Print Utility (EFPU) to download the new firmware to your printer. The EFPU can be found on the System CD.
6. Using the EFPU, send the XXXX.ROM file to the printer. Open the EFPU and press the **Add** button in the Folders section of the dialog box. Give the new folder a name and press **OK**.
7. Now press the **Add** button in the Files section of the dialog box. Find the firmware file that you downloaded from Encad's website and press the **Open** button. This will add the firmware file to the folder you created.
8. Select the firmware file in the Files section of the dialog box and press the **Print** button.
9. The firmware file is sent to the printer as a normal print job. Approximately 20 - 40 seconds later a single beep should be heard indicating the update was successful. After a one second delay, the printer will automatically reboot. The printer should come up normally. Verify the new firmware revision by sequencing through Utility Menu/Service Menu/About Menu. If multiple beeps are heard, reboot printer and reseat your connection to the printer (network cable or parallel cable). Resend the firmware file to the printer. After a one second delay, the printer will automatically reboot. The printer should come up normally. Verify the new firmware revision by sequencing through Utility Menu - Service Menu - About menu.
9. Reinitialize the printer (Setup Menu, User Setup Menu, Init Settings). A single beep will sound from the printer. Cycle power and ensure a normal initialization occurs. Run a prime to verify the unit will print.

## Media Handling System Failure

If the takeup or feed system fails first ensure the printer is in the proper media supply mode. Four modes are available. Sheet, Roll 1, Roll 2, and TakeUp. Roll 1 activates only the top roller to feed media while Roll 2 activates only the bottom roller to feed media.

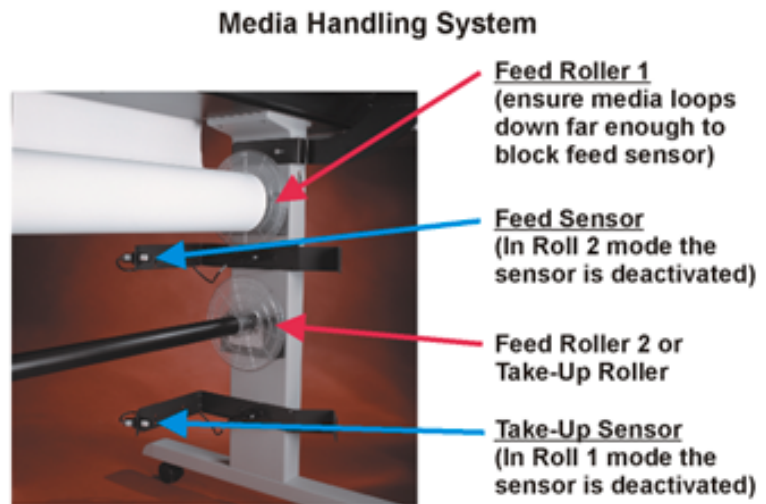


Figure 4-114. Media Handling System.

## Introduction

Chapter 5 contains the procedures for removal and replacement of the **NovaJet 800** series printer assemblies and mechanisms. Illustrations are provided for clarity. Steps for each replaceable part may depend on parts already removed in previous disassembly directions. It is recommended that you read through each procedure before beginning the removal and replacement of any assemblies or mechanisms.

The following tools are recommended to disassemble and reassemble the printer:

- #1 Phillips Torque Screwdriver
- #2 Phillips Torque Screwdriver
- #1 Slotted Torque Screwdriver
- #2 Slotted Torque Screwdriver
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- #1 Slotted Screwdriver
- #2 Slotted Screwdriver
- Wrench, 1/4"
- Screwdriver, Socket Head, 1/4"
- Wire Cutters
- Needle Nose Pliers
- X-ACTO Knife
- ESD Wrist Strap

The following materials are also required:

- Isopropyl Alcohol
- Cotton Swabs
- Lint Free Cloth or Tissue
- Double Sided Tape (1/16" thick, 3/4" wide)
- Loctite Blackmax, P/N 200172

A Hardware Kit is available for the printers. See Chapter 6 of this manual for the part number.



Always turn the printer OFF, remove the power cord and the interface cable before beginning any disassembly procedures. An electrical shock hazard may be present if these precautions are not followed.

## **Remove the Left, Top, and Right Covers**

Removing the Left Cover allows access to the left side of the Platen for removal of the Carriage Assembly, Carriage Drive Belt, Tension Assembly, and the Cutter Activator. Also located on this side is the ink reservoirs and the Ink Delivery System portion that is connected to the reservoirs. Removal of the Left Cover is a requirement to remove the Lower Roller Assembly and the Vacuum Fan(s) from inside the Platen.

Removing the Right Cover provides access to the Main Printed Wiring Assembly (PWA), Display and Keypad circuits, Servo Motor, AC Entry Module, Power Supply and the Power Supply Cooling Fan.

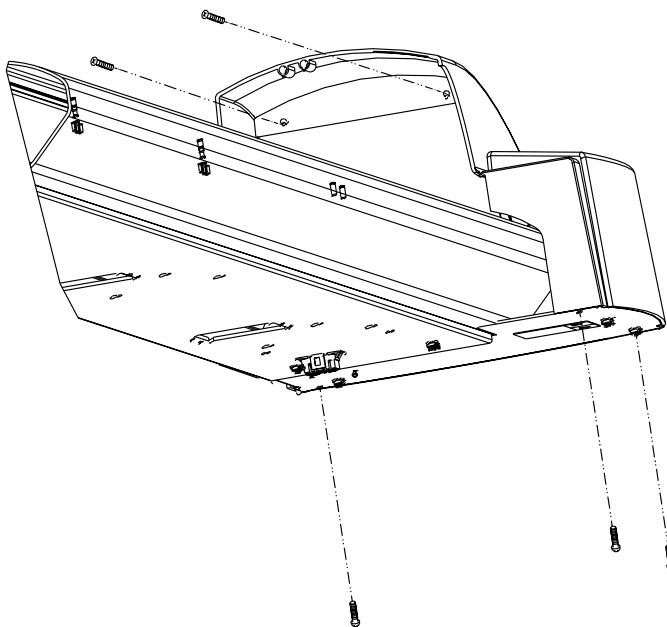
The Top Cover needs to be removed before any of the other covers can be removed. It also gives access to the Carriage Assembly and the Service Station when in the open (up) position and the Carriage is at the Carriage Access position.

### **To remove the Top Cover:**

1. Put the Top Cover in the open position by lifting the front of the Cover to the full upward position.
2. Depress and hold the retracting stop assembly located on the left side of the Top Cover to disengage it from the Left Cover.

3. Lift up on the left side of the Top Cover until it clears the Left Cover while still depressing the retracting stop assembly, then slide the cover to the left to disengage it from the Right Cover.

**To remove the Right Cover Assembly:**



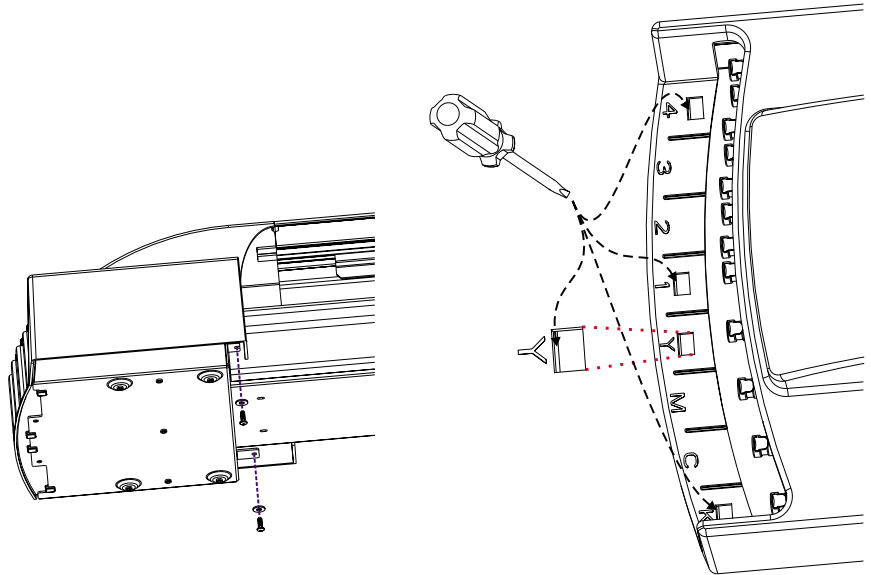
**Figure 5-1. Right Cover Assembly Removal/Installation.**

4. With a #2 Phillips screwdriver, remove the three screws securing the Right Cover Assembly to the Right Baseplate and the two screws securing it to the Right Sideplate. See Figure 5-1.
5. Reach under the Support Bracket and depress and hold the retracting stop assembly that secures the Right Cover Assembly to the Support Bracket.
6. Carefully lift up on the Right Cover Assembly until it clears the printer enough to gain access to the Keypad and Display connections going to the Main Printed Wiring Assembly (PWA).
7. Disconnect the Keypad flex cable connection at the J9 location on the Main PWA. See Figure 3-4 for jack locations on the Main PWA.

8. Disconnect the Display data ribbon cable connector at the J10 location on the Main PWA.

**To remove the Left Cover Assembly:**

1. Disconnect and remove all ink reservoirs.



**Figure 5-2. Left Cover Removal/Installation.**

2. Remove the two screws securing the Left Cover to the Left Frame. See the upper portion of Figure 5-2.
3. Reach under the Support Bracket and depress and hold the retracting stop assembly that secures the Left Cover to the Support Bracket.
4. Insert the tip of a flathead screwdriver into the gap between the Left Cover and the Left Frame as shown in the lower portion of Figure 5-2 and twist. Insert and twist into as many gaps as necessary to loosen the cover from the frame.
5. Carefully lift the Left Cover up and off the printer.

## Install the Left, Top, and Right Covers

### To install the Left Cover:

1. Position the Left Cover over the Left Frame and while depressing the retracting stop assembly on the Support Bracket, lower the Left Cover into position onto the Left Frame. Release the retracting stop assembly.



Applying too much torque to the lower screws can cause the mounts for the standoffs on the cover to break, requiring a replacement of the cover.

2. Using a #2 Phillips screwdriver, secure the Left Cover with two screws located under the frame (torque to 8 in-lbs).
3. Reinstall the ink reservoirs and reservoir door.

### To install the Right Cover Assembly:

1. Position and hold the Right Cover Assembly over the Right Baseplate and reconnect the Display data ribbon cable to J10 on the Main PWA.
2. Reconnect the Keypad flex cable to J9 on the Main PWA. Ensure that the caution label on the flex cable is facing the DIMM slot.
3. While depressing the retracting stop assembly on the Support Bracket, lower the Right Cover Assembly into position onto the Right Baseplate. Release the retracting stop assembly.

**CAUTION**

Applying too much torque to the lower screws can cause the mounts for the standoffs on the cover to break, requiring a replacement of the cover.

4. Secure the Right Cover with two screws located on the left side (torque to 15 in-lbs) and three located under the baseplate (torque to 8 in-lbs.)

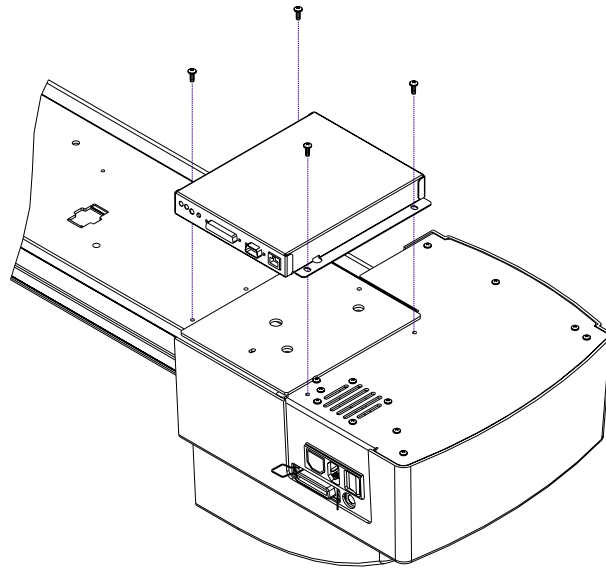
**To install the Top Cover:**

1. Insert the pin located on the right side of the Top Cover into the corresponding hole on the Right Cover Assembly.
2. While depressing the retracting stop assembly on the left side of the Top Cover, lower the left side of the Top Cover into position and secure it to the Left Cover by releasing the retracting stop assembly.

**Remove the E-Connect Network Assembly****CAUTION**

Integrated circuits may be weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Disconnect the network cable and the small parallel cable from the back of the E-Connect Network Assembly.
2. Locate and remove the 4 screws securing the E-Connect Network Assembly to the bottom of the Platen. See Figure 5-3.



**Figure 5-3. E-Connect Assembly Installation/Removal.**

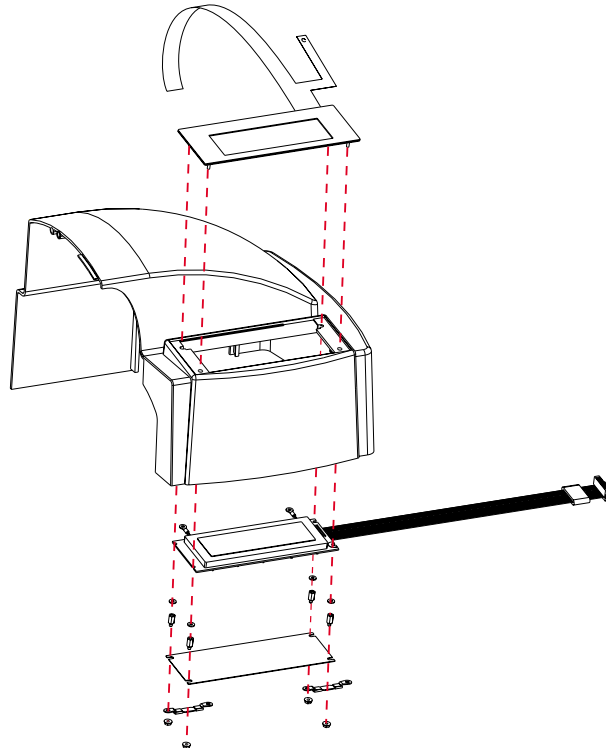
3. Put on an ESD wrist strap.
4. Slowly lower the E-Connector Assembly until you can disconnect the power cable from the connection located near the center of the circuit board.

### **Install the E-Connect Network Assembly**

1. Connect the power cable to the connection located near the center of the circuit board.
2. Hold the E-Connect Assembly in place and secure using 4 screws. Torque to 15 in-lbs
3. Connect the small parallel cable and the network cable to the rear of the E-Connect Assembly.

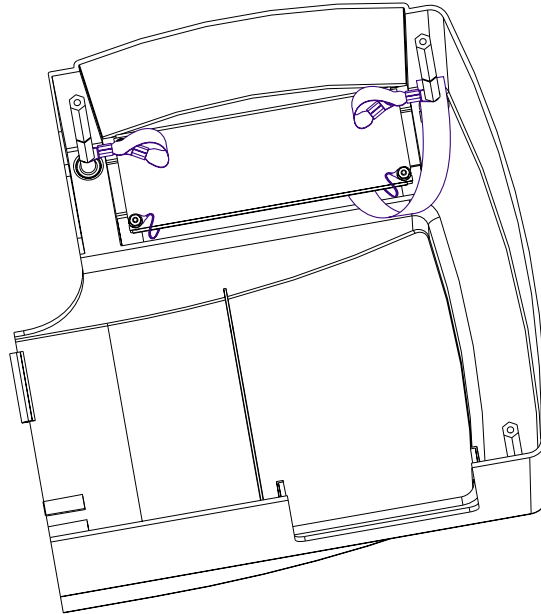
## Remove the Keypad and Display

1. Remove the Top and Right Covers following procedures outlined earlier in this chapter.
2. Turn the Right Cover Assembly over and with a 1/4" socket or wrench, remove the four kepnuts securing the ESD Shield and ground connections. See Figure 5-4. Remove the ESD Shield.
3. With a 1/4" socket or wrench, remove the four standoffs and washers that secure the LCD Display Assembly to the Keypad. Remove the Display Assembly.



**Figure 5-4. Keypad and Display Installation/Removal.**

4. Disconnect the grounding flex cable from the large standoff before removing the Keypad Assembly. See Figure 5-5 for location. Remove the Keypad Assembly.



**Figure 5-5. Keypad and Display Grounding Connections.**

### **Install the Keypad and Display**

1. Route the Keypad flex data and ground cables into the Right Cover Assembly through the hole provided for the Keypad.
2. Place the Keypad into position and hold. Turn the Right Cover Assembly over and position the Display Assembly onto the threaded studs of the Keypad. Secure using four standoffs and washers. Tighten by hand.
3. Attach the Keypad grounding flex cable to the cover standoff as shown in Figure 5-5. Ribbon must be closer to the plastic side of the cover with the contact side towards the ground strap.

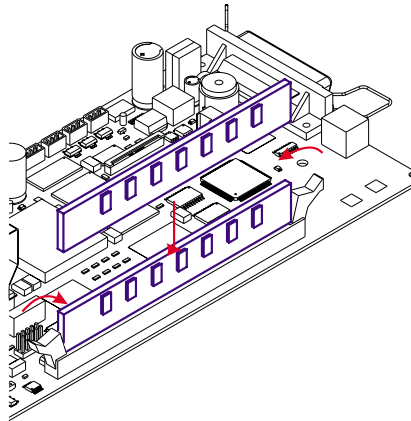
4. Place the ESD Shield onto the Display standoffs using four kepnuts with a 1/4" socket or wrench. Torque to 2.5 in-lbs.
5. Attach ground connections to the Cover Standoffs as shown in Figure 5-5. Apply a small drop of loctite into the Cover holes, attach Standoffs and torque to 6 in-lbs.
6. Install the Top and Right Covers following procedures outlined earlier in this chapter.

## Remove Memory Module

### CAUTION

Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Remove the Top and Right Covers following procedures outlined earlier in this chapter.



**Figure 5-6. Memory Module Removal/Installation.**

2. Facing the right side of the Memory Module, push the side clips gently to the outside (away from the memory module). Lift up and pull the module out. See Figure 5-6.

## Install Memory Module

1. Slowly push the Memory Module into place. Make sure the module is fully seated.
2. Push the side clips towards the Memory Module until they hold the module securely in place.
3. Install the Top and Right Covers following procedures outlined earlier in this chapter.

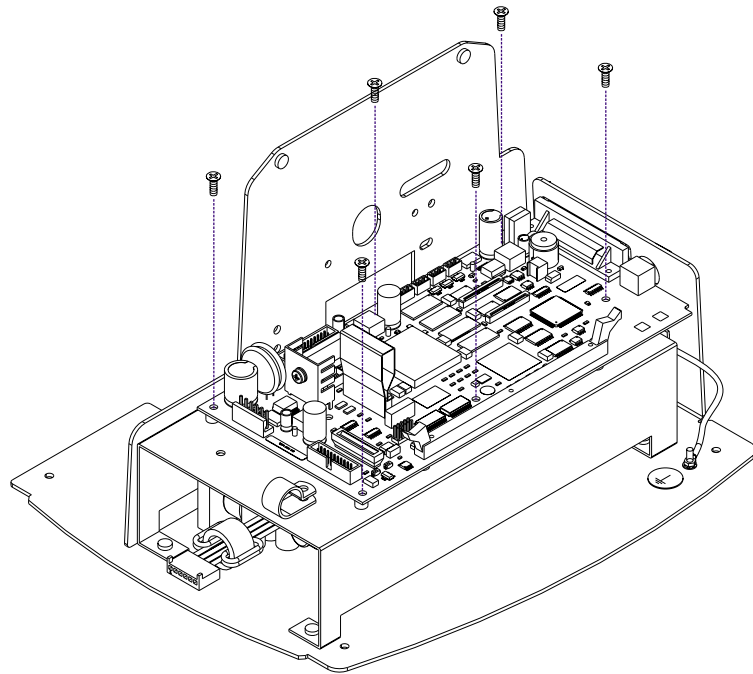
## Remove the Main Printed Wiring Assembly (PWA)



Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Remove the Top and Right Covers following procedures outlined earlier in this chapter.
2. Put on an ESD wrist strap.
3. Remove memory module following procedures outlined earlier in this chapter.
4. Disconnect the Power Supply connection at the J8 location by grasping the Power Supply connector with thumb and forefinger and pulling straight out. See Figure 3-4 for jack locations.
5. Disconnect the Stepper Motor connection at the J7 location by grasping the Stepper Motor connector with thumb and forefinger and pulling straight out.
6. Disconnect the Servo Motor connection (red and blue wires) at the J12 location by grasping the Servo Motor connector with thumb and forefinger and pulling straight out.

7. Disconnect the Leg Harness connection at the J6 location by grasping the Leg Harness connector with thumb and forefinger and pulling straight out.
8. Disconnect the Trailing Cable B connection at the J2 location. Use the thumb and forefinger to pull up on the connector lock and remove the Trailing Cable from the connector.
9. Disconnect the Trailing Cable A connection at the J1 location. Use the thumb and forefinger to pull up on the connector lock and remove the Trailing Cable from the connector.
10. Disconnect the Autoload Sensor connection at the J13 location by grasping the Autoload Sensor connector with thumb and forefinger and pulling straight out.
11. Disconnect the Vacuum Fan 1 connection at the J15 location by grasping the Vacuum Fan 1 connector with thumb and forefinger and pulling straight out.
12. Disconnect the Vacuum Fan 2 connection at the J4 location (60 inch model only) by grasping the Vacuum Fan 2 connector with thumb and forefinger and pulling straight out.
13. Disconnect the Power Supply Cooling Fan connection at the J17 location by grasping the Power Supply Cooling Fan connector with the thumb and forefinger and pulling straight out.
14. Disconnect the E-Connect Power connection at the J18 location by grasping the E-Connect Power connector with the thumb and forefinger and pulling straight out.
15. Disconnect the ground straps going to the side plate and baseplate by removing the screw located near the parallel port on the Main PWA.
16. Using care, remove the Main PWA by unscrewing the remaining screws securing the Main PWA to the bracket. See Figure 5-7.



**Figure 5-7. Main PWA Removal.**

**CAUTION**

Failure to use an approved antistatic bag for storage or shipment may cause damage to the Main PWA and affect the Warranty.

17. Place the Main PWA in an ESD bag (antistatic bag) in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored at your facility for repair.

**Install the Main Printed Wiring Assembly (PWA)****CAUTION**

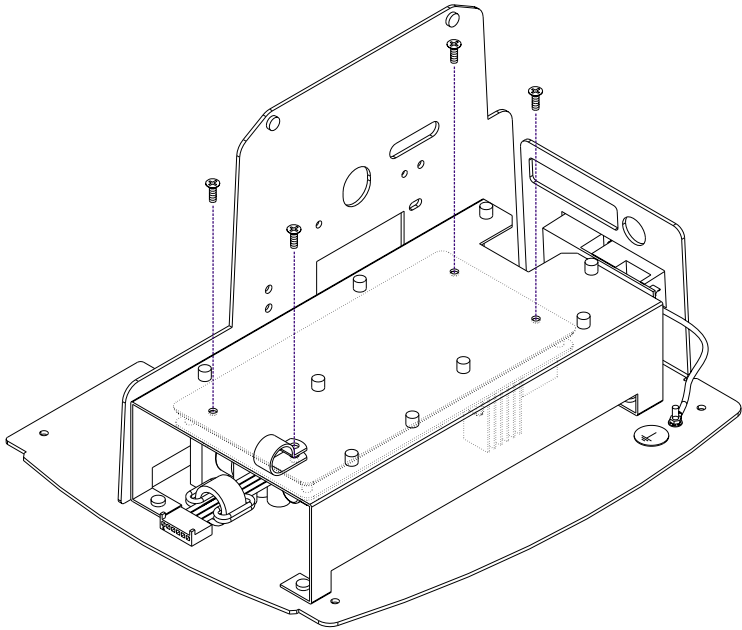
Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Put on an ESD wrist strap.
2. Remove the Main PWA from the ESD bag.
3. Align the Main PWA so that the serial and parallel connections protrude out of the back of the printer and that the screw holes are aligned to the holes on the power supply bracket.
4. Fasten the Main PWA to the power supply bracket with 8 in-lb of torque. Ensure that the ground straps from the side plate and baseplate are secured to the Main PWA by the screw located beside the side plate nearest to the parallel port.
5. Connect the E-Connect Power connector to J18 on the Main PWA.
6. Connect the Power Supply Cooling Fan connector to J17 on the Main PWA.
7. Connect the Vacuum Fan 2 (60 inch only) connector to J4 on the Main PWA.

8. Connect the Vacuum Fan 1 connector to J15 on the Main PWA.
9. Connect the AutoLoad Sensor connector to J13 on the Main PWA.
10. Connect and lock the Trailing Cable A connector to J1 on the Main PWA.
11. Connect and lock the Trailing Cable B connector to J2 on the Main PWA.
12. Connect the Leg Harness connector to J6 on the Main PWA.
13. Connect the Servo Motor connector to J12 on the Main PWA.
14. Connect the Stepper Motor connector to J7 on the Main PWA.
15. Connect the Power Supply connector to J8 on the Main PWA.
16. Reinstall the Memory Module into U24 by following procedures outlined earlier in this chapter.
17. Install the Top and Right Covers following procedures outlined earlier in this chapter.

## **Remove Power Supply, Cooling Fan, and AC Entry Module**

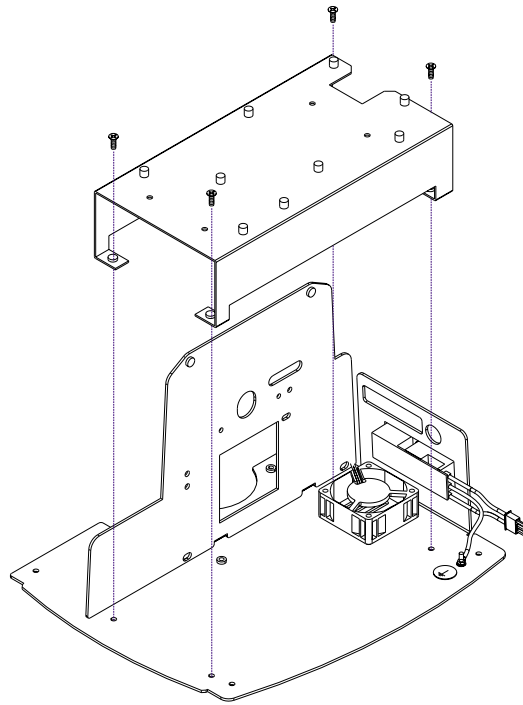
1. Remove the Top and Right Covers and the Main PWA following procedures outlined earlier in this chapter.
2. Ensure that the Main PWA is placed in an ESD bag (antistatic bag) for protection.
3. Reach between the Power Supply Bracket and the AC Entry Module and carefully pull out the quick disconnect assembly attaching the Power Supply input to the AC Entry Module. Disconnect the Power Supply input from the AC Entry Module.
4. Disconnect the clip securing the power supply wires to the top of the support bracket.
5. While holding the Power Supply in place, remove the four screws securing it to the Power Supply Bracket. See Figure 5-8.
6. Slide the Power Supply out of the Power Supply Bracket.



**Figure 5-8. Power Supply Removal.**

**To remove the Cooling Fan and AC Entry Module:**

1. Remove the four screws located below the Right Baseplate securing the Power Supply Bracket to the Right Baseplate. Remove the Power Supply Bracket. See Figure 5-9.
2. Using a Phillips screwdriver and a 1/4" wrench or socket, remove the Fan from the Right Baseplate.
3. Using a 1/4" wrench or socket, disconnect the AC Entry Module ground from the ground stud on the Right Baseplate.
4. Remove the AC Entry Module by pressing in on the securing tabs until the module is released.



**Figure 5-9. Cooling Fan/AC Entry Module Removal.**

## **Install the Power Supply, Cooling Fan, and AC Entry Module**

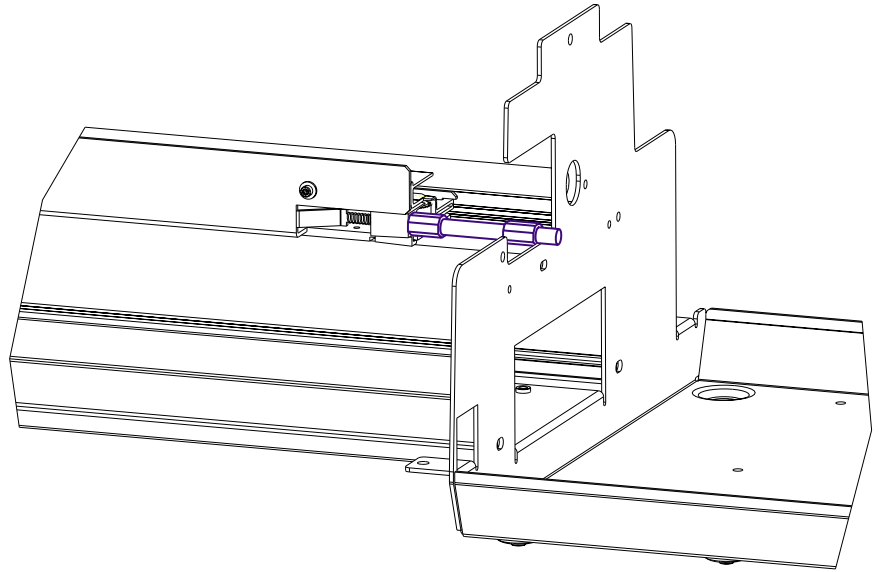
### **To install the Cooling Fan and AC Entry Module:**

1. Insert the AC Entry Module into the AC Entry Module hole on the Right Baseplate. Press in until it snaps securely into place.
2. Attach the AC Entry Module ground connection to the grounding stud on the Right Baseplate.
3. Hold the Cooling Fan into place while inserting the four bolts into the assembly. Attach the four 1/4" nuts to the bolts to secure Fan assembly. Torque to 4 in-lbs.
4. Reinstall the Power Supply Bracket using four screws.

5. Insert and hold the Power Supply into place while securing it with four screws. Torque to 15 in-lbs.
6. Reconnect the Power Supply to the AC Entry Module by reattaching the quick disconnect connection. Push the quick disconnect assembly behind the Power Supply Bracket and out of sight.
7. Install the Main PWA, Top and Right Covers following procedures outlined earlier in this chapter.

## **Remove Servo Motor**

1. Remove the Top and Right Covers and the E-Connect Network Assembly following procedures outlined earlier in this chapter.
2. Disconnect the Servo Motor connection (red and blue wires) at the J12 location on the Main PWA by grasping the Servo Motor connector with thumb and forefinger and pulling straight out.
3. Remove the E-Connect Plate located below the Servo Motor. Move the E-Connect power cable into the platen and out of the way.
4. Obtain the Belt Removal Tool, spin the movable side to shorten the distance between the two brass pieces.
5. Insert the Belt Removal Tool between the Left Frame Assembly and the Frame Tensioner. See Figure 5-10. Ensure that the movable side is against the Left Frame Assembly and the non-movable side is against the Frame Tensioner.



**Figure 5-10. Using the Belt Removal Tool.**

6. Turn the movable side so that the tool begins to expand and the Frame Tensioner Spring compresses. Continue to turn on the Belt Removal Tool until the belt can be lifted off of the Servo Motor pulley.
7. Move the Carriage Belt to the left so it is out of the way of the Servo Motor pulley.
8. Move the Carriage Assembly to the left end of the Slide Shaft.
9. Lift up gently and hold the right end of the Trailing Cables.
10. Remove the back screw on the Servo Motor. The screwdriver will be held at a slight angle.

## CAUTION

Be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

11. Lower the Trailing Cable back into place.
12. While holding the Servo Motor, remove the front screw on the Servo Motor.
13. Lower the motor to clear the platen and carefully bring the motor out of the printer.

### **Install Servo Motor**

1. Reinsert the Servo Motor under the Platen with the connector facing the FRONT side of the Platen. Guide the pulley up through the opening in the Platen.
2. Once the Servo Motor pulley is through the Platen, push up on the Servo Motor and align the screw holes with the screw hole openings.
3. Insert the front screw into the Servo Motor and tighten it almost all the way.
4. Lift up gently and hold the right end of the Trailing Cables.

## **CAUTION**

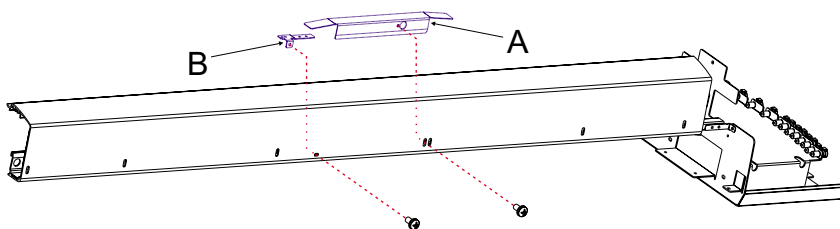
Make sure the screw does not go into the motor at an angle, and be careful not to strip the head of the screw or to cause damage to the Encoder Strip.

5. Insert the back screw into the Servo Motor and tighten it.
6. Tighten both screws on the Servo Motor to 15 in-lb of torque.
7. Slide the Carriage Belt over the Servo Motor pulley. Make sure that the guides on the inside of the belt are inserted in the pulley grooves and that the belt is not twisted.
8. Turn the Belt Removal Tool to tighten the belt around the Servo Motor pulley.
9. Move the Carriage Assembly back and forth to check the Carriage Belt tension. Remove the Belt Removal Tool.

10. Route the E-Connect power cable through the grommet on the E-Connect Plate. Reinstall the E-Connect Plate under the Platen. Torque to 15 in-lbs.
11. Connect the Servo Motor connector to J12 on the Main PWA.
12. Install the E-Connect Network Assembly and the Top, Left and Right Covers following procedures outlined earlier in this chapter.

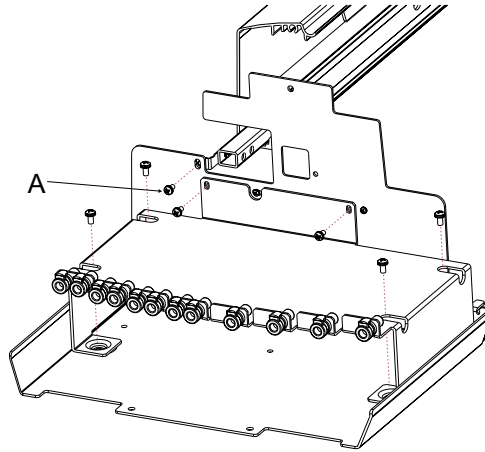
## Remove the Ink Delivery System

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the screw securing the Chain Guide to the Chain Support Bracket. See item A in Figure 5-11.



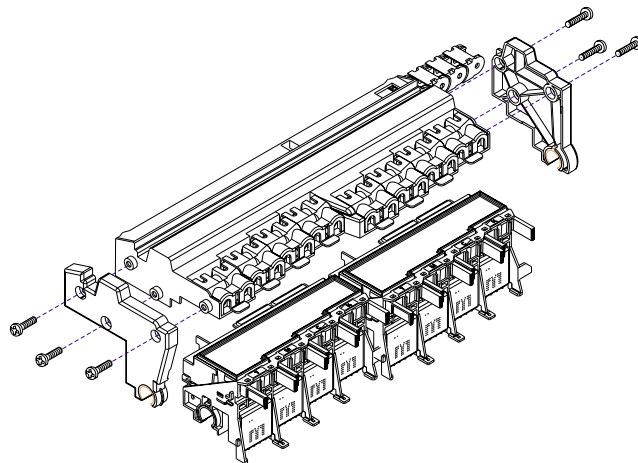
**Figure 5-11. Chain Guide Removal.**

3. Remove the screw securing the back part of the Ink Delivery System to the Chain Support Bracket. See item B in Figure 5-11.
4. Remove the screw securing the Ink Delivery System Bracket to the Left Frame. See item A in Figure 5-12.



**Figure 5-12. Left Side of Ink Delivery System.**

5. Remove the remaining six screws securing the Fitting Mount Bracket (left portion of the Ink Delivery System) to the Left Frame. See Figure 5-12
6. Move the Carriage to the center of the Slide Shaft.



**Figure 5-13. Floating Carriage Cover Removal.**

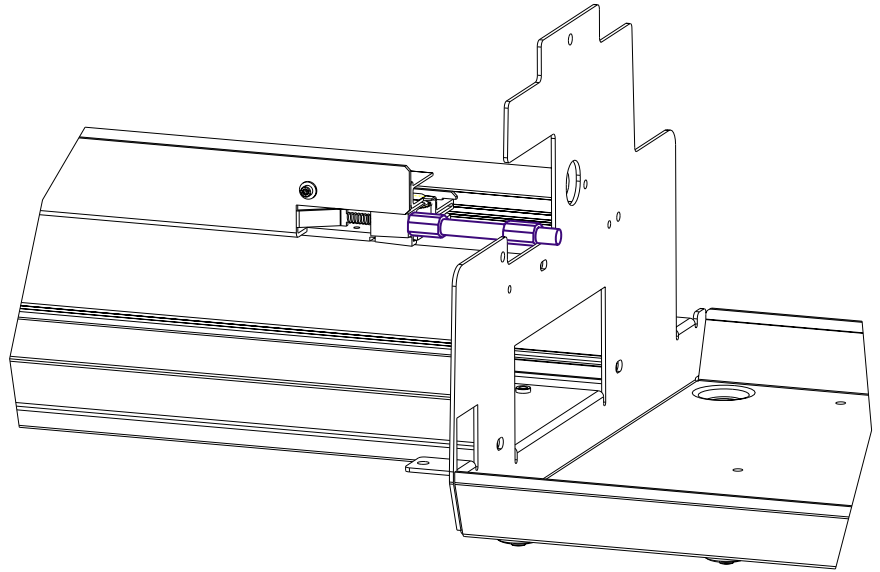
7. Remove the Floating Carriage Cover from the Left and Right Support Brackets. The Floating Carriage Cover is part of the Ink Delivery System. See Figure 5-13.
8. Carefully slide the Ink Delivery System out of the left side of the printer.

### **Install the Ink Delivery System**

1. Carefully slide the Ink Delivery System into the printer.
2. Secure the Floating Carriage Cover to the Left and Right Support Brackets. Torque to 6 in-lbs.
3. Secure the Ink Delivery System Bracket to the Left Frame. Torque to 15 in-lbs.
4. Secure the Ink Delivery System to the Chain Support Bracket. See item B in Figure 5-11. Torque to 15 in-lbs.
5. Reattach the Chain Support Bracket to the Rear Support Bracket. See item A in Figure 5-11. Torque to 15 in-lbs.
6. Secure the Fitting Mount Bracket (left portion of the Ink Delivery System) to the Left Frame using six screws. Torque to 15 in-lbs.
7. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

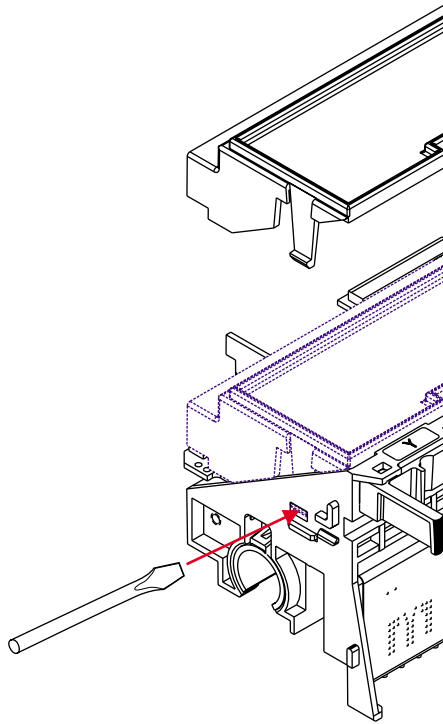
### **Remove the Carriage Assembly, Carriage Belt, and the Frame Tensioner**

1. Remove the Top, Left and Right Covers and the Ink Delivery System following procedures outlined earlier in this chapter.
2. Obtain the Belt Removal Tool, spin the movable side to shorten the distance between the two brass pieces.
3. Insert the Belt Removal Tool between the Left Frame Assembly and the Frame Tensioner. See Figure 5-14. Ensure that the movable side is against the Left Frame Assembly and the non-movable side is against the Frame Tensioner.



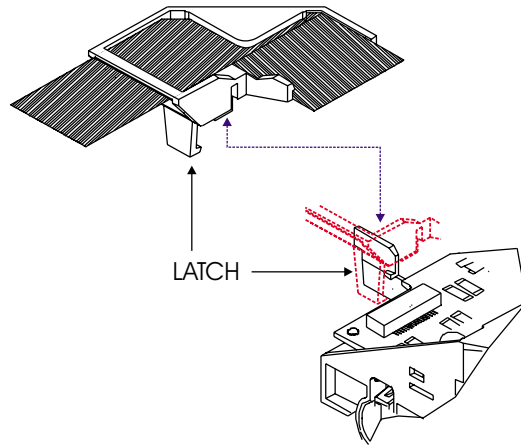
**Figure 5-14. Using the Belt Removal Tool.**

4. Turn the movable side so that the tool begins to expand and the Frame Tensioner Spring compresses. Continue to turn on the Belt Removal Tool until the belt can be lifted off of the Servo Motor pulley.
5. Turn the Belt Removal Tool in the opposite direction to remove the pressure exerted onto the Frame Tensioner. Remove the Belt Removal Tool. Remove the Frame Tensioner Assembly.
6. Remove the four screws securing the Left Frame Assembly and the Left Frame Assembly from the rest of the printer.
7. With a flathead screwdriver, press the left tab on the left Electronics Cover through the left Carriage Frame Assembly and remove the Electronics Cover. Perform the same procedure on the right Electronics Cover by pressing the right tab on the right Electronics Cover. See Figure 5-15.



**Figure 5-15. Electronics Covers Removal.**

8. Remove the Trailing Cables and Strain Reliefs from both Carriages by releasing the latch on the left lower side of the Strain Relief and lifting it off of the Carriages. See Figure 5-16.



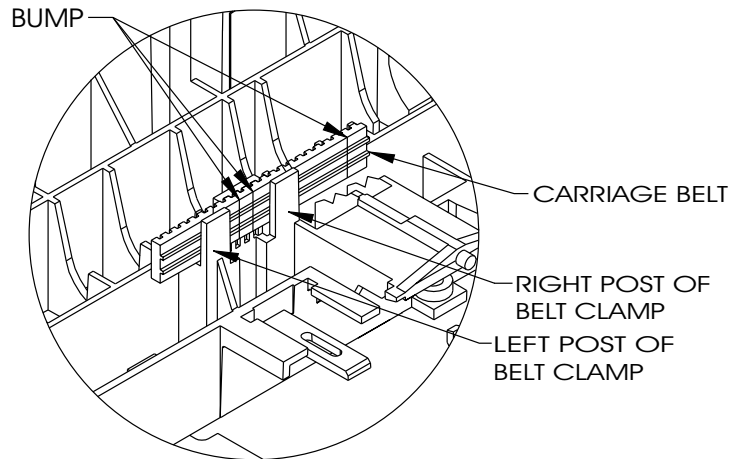
**Figure 5-16. Strain Relief Removal/Installation.**

9. Slide the Carriage Assembly to the left edge of the Slide Shaft while taking up the slack of the Belt at the same time.

## **NOTE**

The Belt is connected to the right Carriage only. The left Carriage is directly connected to the right Carriage. The left Carriage moves with the right Carriage, which is driven by the Belt.

10. Slide the Carriage Assembly slowly off the left side of the Slide Shaft until the left Carriage slides off of the Slide Shaft and disconnects itself from the right Carriage. Place the left Carriage aside.
11. Slide the right Carriage and Drive Belt off the left side of the Slide Shaft.
12. Once the right Carriage is removed from the Slide Shaft, turn it over so that you can see the Belt Clamp. See Figure 5-17.



**Figure 5-17. Carriage Belt Clamp.**

13. To disengage the Carriage Belt from the Belt Clamp, push the Carriage Belt away from the left post of the Belt Clamp and gently lift up until the bottom edge of the Carriage Belt clears the top of the left post.
14. Push the Carriage Belt away from the right post of the Belt Clamp and gently lift up to finish removing the Carriage Belt from the Belt Clamp.

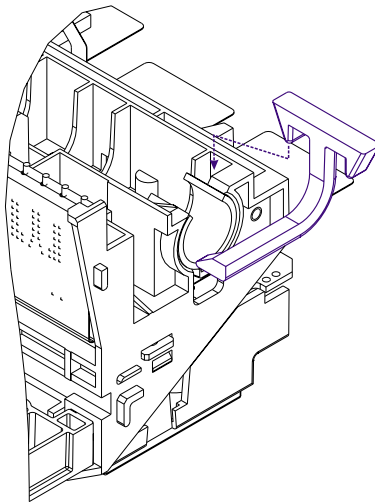
## CAUTION

Failure to use an approved antistatic bag for storage or shipment may cause damage to the Carriage PWA and affect the Warranty.

15. Place the Carriage(s) in an ESD (antistatic) bag in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored for repair at your facility.

## Install the Carriage Assembly, Carriage Belt, and the Frame Tensioner

1. To install the Belt onto the right Carriage, the “bumps” on the belt (where the ends of the belt are joined together to make the belt continuous) must be positioned between the left and right posts of the Belt Clamp. See Figure 5-17.
2. Slide the Carriage Belt between the right post and the middle post and guide it down into the Belt Clamp. Then slide the Carriage Belt between the left post and the middle post and finish placing the Carriage Belt into the Belt Clamp.
3. Check the position of the Carriage Belt to make sure it matches Figure 5-17.
4. Make sure the left end of the Trailing Cables extends out beyond the left end of the Trailing Cable Support Assembly.
5. Position and hold into place the Carriage Coupler onto the right Carriage. See Figure 5-18.

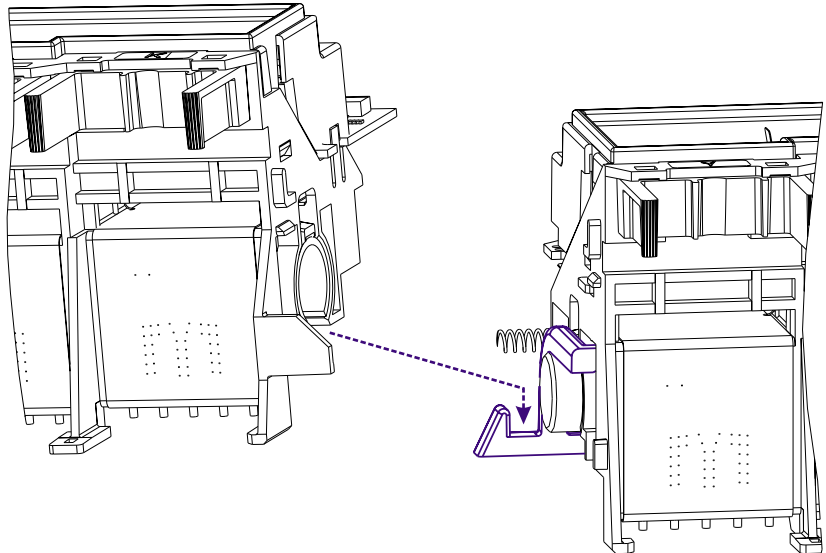


**Figure 5-18. Carriage Coupler Installation.**

6. Slide the right Carriage onto the left end of the Slide Shaft, making sure that the Encoder Strip fits into the slot in the Slider and the

Encoder on the Carriage PWA. Ensure that the Carriage Coupler goes over the top of Slide Shaft. Stretch out the Belt towards the Servo Motor to ensure that there are no twists in it. Leave enough of the Belt loop overhanging the left side to ensure that the left Carriage will not bind in the Belt when installing the left Carriage.

7. While holding the Carriage Compression Spring in place on the right Carriage, position the left Carriage above and to the left of the right Carriage as shown in Figure 5-19. Slowly move the left Carriage down and to the right until the Carriage Compression Spring and Carriage Coupler are attached to the left Carriage. At this point, the left Carriage should easily slide onto the Slide Shaft.



**Figure 5-19. Left Carriage Installation.**

8. Move the Carriage Assembly back and forth over the Slide Shaft to ensure that the Belt is not binding on the Carriage Assembly.
9. Insert both Strain Reliefs (with Trailing Cables) onto the Carriage Assembly by sliding it onto the Strain Relief Support until it snaps firmly into place.
10. Place the Trailing Cables into the J1 connector locks on each of the

Carriage PWAs. Make sure the silver fingers on the Trailing Cable are fully inserted into the lock and slide both sides of the connector lock shut at the same time.

11. Position the Electronics Cover over the right Carriage and gently press down on the ends of the Electronics Cover until the latches snap into the right Carriage. Perform the same procedure to attach the other Electronics Cover onto the left Carriage.
12. Slide the Carriage Assembly to about the middle of the Slide Shaft and stretch out the Carriage Belt.
13. Insert the Carriage Belt into the Frame Tensioner so that the belt extends about an inch past the Frame Tensioner.
14. Holding the Carriage Belt and Frame Tensioner, insert the Idler Pulley Assembly into the loop of the belt. Make sure that the side of the Idler Pulley Assembly with the thicker outer ring of plastic is facing up.
15. Once the Idler Pulley Assembly is in position, pinch the belt to hold the Idler Pulley Assembly in place and pull it into the Frame Tensioner so that the axle rests in the V-shaped groove in the Frame Tensioner.
16. Insert the Compression Spring into the opening in the back of the Frame Tensioner so that the end of the spring fits over the post inside the opening.
17. Fit the Compression Spring over the post at the back of the Y-Arm Assembly.
18. Fit the notch in the front end of the Frame Tensioner over the notch in the front of the Y-Arm Assembly.
19. Obtain the Belt Removal Tool, spin the movable side to shorten the distance between the two brass pieces.
20. While holding the Frame Tensioner in place, insert the Belt Removal Tool between the Left Frame Assembly and the Frame Tensioner. See Figure 5-10. Ensure that the movable side is against the Left Frame Assembly and the non-movable side is against the Frame Tensioner.
21. Turn the movable side so that the tool begins to expand and the Frame Tensioner Spring compresses. Continue to turn on the Belt Removal Tool until the belt can be lifted over the Servo Motor pulley. Slip the Carriage Belt over the Servo Motor pulley. Make sure that the guides in the Carriage Belt are properly fitted over the Servo Motor pulley and that the belt is not twisted.

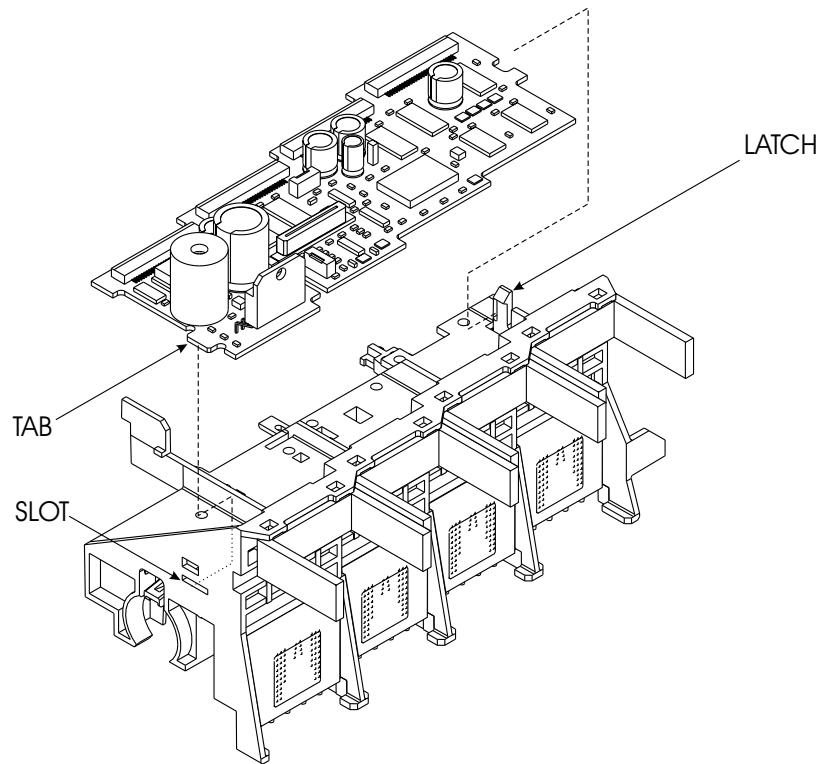
22. Turn the Belt Removal Tool to tighten the belt around the Servo Motor pulley.
23. Move the Carriage Assembly back and forth to check the Carriage Belt tension. Remove the Belt Removal Tool.
24. Gently move the Carriage Assembly from end to end and make sure that the Carriage Belt is not binding
25. Install the Ink Delivery System following procedures outlined earlier in this chapter.
26. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

## **Remove the Carriage PWA**



Integrated circuits may become weakened or damaged by electrical discharge. Do not touch or work near integrated circuits without wearing an ESD wrist strap.

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Ink Delivery System and the Carriage Assembly following procedures outlined earlier in this chapter to remove the Carriage Assembly from the Slide Shaft.
3. Put on an ESD wrist strap.
4. Unlock the connectors and remove all flex cables on the Carriage PWA.



**Figure 5-20. Carriage PWA Removal/Installation.**

5. Unlock the latch on the right end of the Carriage and lift up the right end of the Carriage PWA. See Figure 5-20.
6. Slide the Carriage PWA to the right to remove the tab on the left end of the Carriage PWA from the slot in the Carriage.

## **CAUTION**

Failure to use an approved antistatic bag for storage or shipment may cause damage to the Carriage PCB and affect the Warranty.

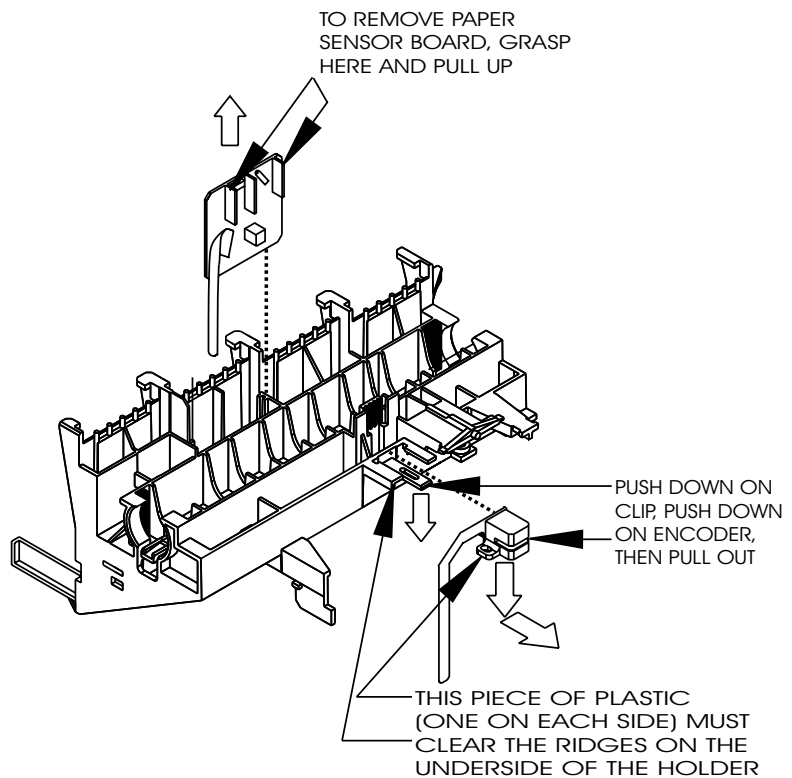
7. Place the Carriage PWA in an ESD bag (antistatic bag) in preparation for shipment to **ENCAD** for replacement or repair, or if it is to be stored at your facility for repair.

### **Install the Carriage PWA**

1. Put the tab on the left end of the Carriage PWA into the slot in the left side of the Carriage. See Figure 5-20.
2. Ensure that no flex cables are underneath the Carriage PWA.
3. Push down the right end of the Carriage PWA until the latch snaps into place.
4. Reattach all flex cables on the Carriage PWA.
5. Install the Carriage Assembly and Ink Delivery System following procedures outlined earlier in this chapter.
6. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

## Remove the Paper Sensor or the Encoder Sensor

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Ink Delivery System and the Carriage Assembly following procedures outlined earlier in this chapter to remove the Carriage Assembly from the Slide Shaft.



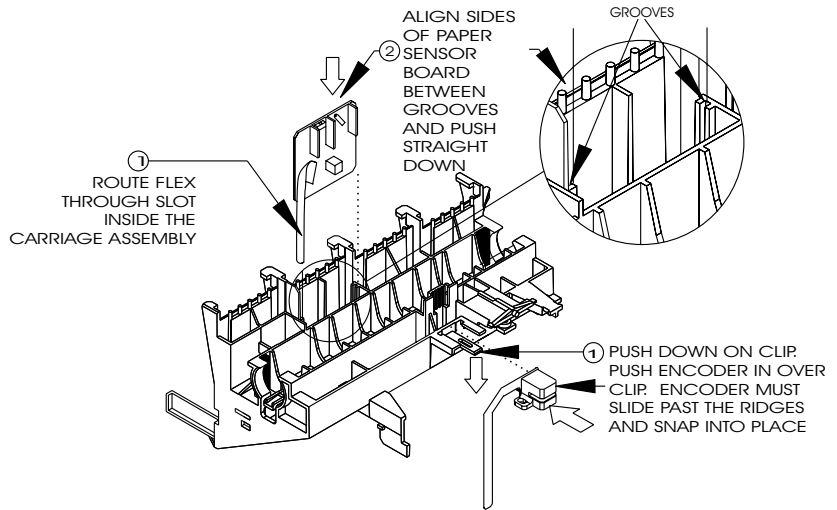
**Figure 5-21. Paper and Encoder Sensor Removal.**

## **NOTE**

The Paper Sensor and Encoder Sensor are only installed onto the right Carriage. All procedures in this section refer to the right Carriage only.

3. To remove the Paper Sensor:
  - a. Unlock the connector at J3 and remove the flex cable.
  - b. Turn the Carriage over and hold it while firmly grasping the Paper Sensor between thumb and index finger. See Figure 5-21.
  - c. Pull straight up on the Paper Sensor and remove it from the Carriage Assembly.
4. To remove the Encoder Sensor:
  - a. Unlock the connector at J2 and remove the flex cable.
  - b. Turn the Carriage over and lay it with the top side facing down.
  - c. Push down on the plastic clip and at the same time push down on the Encoder until the plastic pieces on each side of the Encoder clear the ridges which hold it in place. Then pull it straight out.

## Install the Paper Sensor or the Encoder Sensor



**Figure 5-22. Paper and Encoder Sensor Installation.**

### NOTE

The Paper Sensor and Encoder Sensor are only installed onto the right Carriage. All procedures in this section refer to the right Carriage only.

#### **1. To install the Paper Sensor:**

- a. Turn the Carriage so that the bottom side of it is facing up.
- b. Route the flex on the Paper Sensor through the slot in the Carriage. Make sure the flex cable goes all the way through and does not curl under the Carriage PWA.
- c. Grasp the Paper Sensor between thumb and index finger and guide the sides of the board into the grooves on each side of the opening. See Figure 5-22.
- d. Push the Paper Sensor board down into the Carriage Assembly until it snaps firmly into place.

- e. Turn the Carriage over and insert the Paper Sensor flex cable into the connector at J3.
  - f. Push both sides of the connector lock shut at the same time.
- 2. To install the Encoder Sensor:**
- a. Turn the Carriage so that the bottom side of it is facing up.
  - b. Push down on the plastic clip and slide the back of the Encoder Sensor over it.
  - c. Push the Encoder Sensor in past the ridges until the Encoder Sensor snaps into place.
  - d. Turn the Carriage over and insert the Encoder flex cable into the connector at J2.
  - e. Push both sides of the connector lock shut at the same time.
- 3.** Install the Carriage Assembly and Ink Delivery System following procedures outlined earlier in this chapter.
- 4.** Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

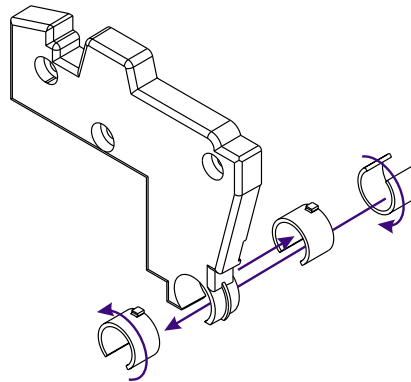
## **Replacing the Floating Carriage Cover Bushings**

- 1. Position the Carriage Assembly to the right side of the center of the Slide Shaft. Make sure that the Chain Guide on the Chain Support Bracket is not blocking the Floating Carriage Cover or it may be very difficult to perform these procedures.
- 2. Remove the three screws securing the Left Support Bracket to the Floating Cover. Slide the Left Support Bracket to the left, away from the Carriage Assembly and Floating Carriage Cover.

## **NOTE**

Only one Support Bracket needs to be removed from the Floating Carriage Cover for this procedure. In these procedures the left one is being removed, but the right one can just as easily be taken off instead.

3. Using a small tool, remove the bushing from the Left Support Bracket. The bushing must be removed from the right side of the bracket.
4. Rotate the bushing 180° to pass the bushing through the Left Support Bracket without it getting caught on the tab of the bushing. See Figure 5-23. Slide the bushing through the support bracket and out the other side.



**Figure 5-23. Floating Carriage Cover Bushing Removal.**

5. Rotate the bushing 180° again so that it will clear the Pinch Rollers and the Slide Shaft Supports. Slide the bushing off the left side of the Slide Shaft.

## **NOTE**

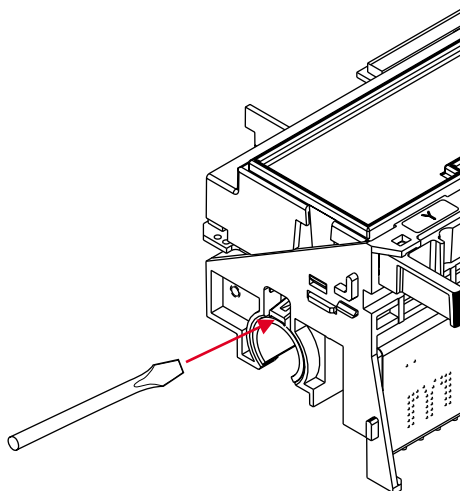
If the bushing falls through the hole on the side, removal of that particular cover will need to be performed to retrieve the bushing.

6. Slide a new bushing onto the Slide Shaft and position it near the Left Support Bracket.
7. Rotate the bushing 180° to pass the bushing through the Left Support Bracket without it getting caught on the tab of the bushing. See Figure 5-23. Slide the bushing through the support bracket and out the other side.
8. Rotate the bushing 180° again and insert it into the Left Support Bracket.

9. Perform the same procedure to replace the Right Support Bracket bushing.

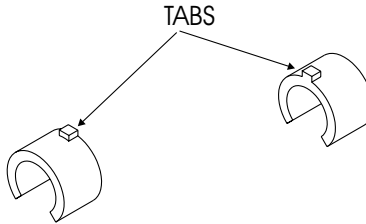
## Replacing the Carriage Bushings

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Ink Delivery System and the Carriage Assembly following procedures outlined earlier in this chapter to remove the Carriage Assembly from the Slide Shaft.



**Figure 5-24. Carriage Bushing Removal.**

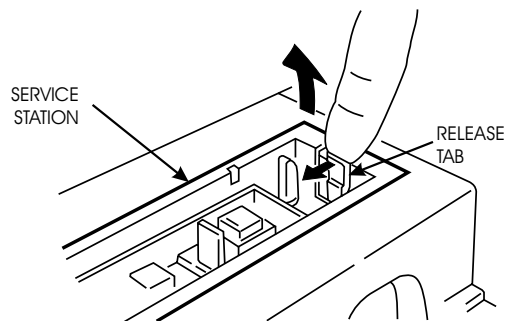
3. Use a flat tip screwdriver to push up on the latch which holds the Carriage bushing in place. See Figure 5-24.
4. Pull the Carriage bushing out of the Carriage.
5. Repeat these procedures for the other Carriage bushings.



**Figure 5-25. Carriage Bushing Installation.**

6. Orient the new bushing as shown in Figure 5-25 so that the metal tab on top of the bushing goes into the Carriage Assembly first.
7. Push the bushings in until they snap into place.
8. Install the Carriage Assembly and Ink Delivery System following procedures outlined earlier in this chapter.
9. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

## Remove the Service Station



**Figure 5-26. Service Station Removal.**

1. Place the Top Cover in the open position.
2. Move the Carriage Assembly to the left side of the Slide Shaft.
3. Reach into the Right Cover and pull back on the Service Station release tab located on the far side of the Service Station. See Figure 5-26.
4. Raise the right side of the Service Station out of the Platen.

5. Lift out the left side of the Service Station from the Platen and remove the Service Station. Moving the Service Station farther to the right might be required to release the left side of the Service Station.

## **Install the Service Station**

1. To install the Service Station, position the Service Station inside the Right Cover and place the left side of the Service Station into the Platen.
2. Push down on the right side of the Service Station until the Service Station snaps into place.
3. Slide the Carriage Assembly to the right and back into the home position. Lower the Top Cover.

## **Remove the Trailing Cable Assembly**

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Position the Carriage Assembly to the right side of the center of the Slide Shaft. Make sure that the Chain Guide on the Chain Support Bracket is not blocking the Floating Carriage Cover or it may be very difficult to perform these procedures.
3. Remove the three screws securing the Left Support Bracket to the Floating Cover. Slide the Left Support Bracket to the left, away from the Carriage Assembly and Floating Carriage Cover. Carefully move the Floating Carriage Cover/Right Support Bracket Assembly to the right.
4. Remove the Electronics Covers and release the left end of the Trailing Cables from the Carriage PWAs.
5. Release the Strain Reliefs (with the Trailing Cables and ferrite attached) from the Carriages.
6. Disconnect the Trailing Cable Assembly connectors at the J1 and J2 locations on the Main PWA. Use the thumb and forefinger to pull forward on the connector lock and remove the Trailing Cables from their connectors. See Figure 3-6.

7. The Trailing Cable Assembly is secured to the Stabilizer Bracket by two pieces of double sided tape. Remove the Trailing Cable Assembly from the Stabilizer Bracket.
8. Mark the position of the double sided tape on the Stabilizer Bracket before removing. It is important that the new tape is placed in the exact position as the older pieces were. Remove any remnants of tape still on the Stabilizer Bracket.

### **Install the Trailing Cable Assembly**

1. Apply two new pieces of double sided tape to the Stabilizer Bracket. Ensure that the tape is in the same location as the original tape was.

## **CAUTION**

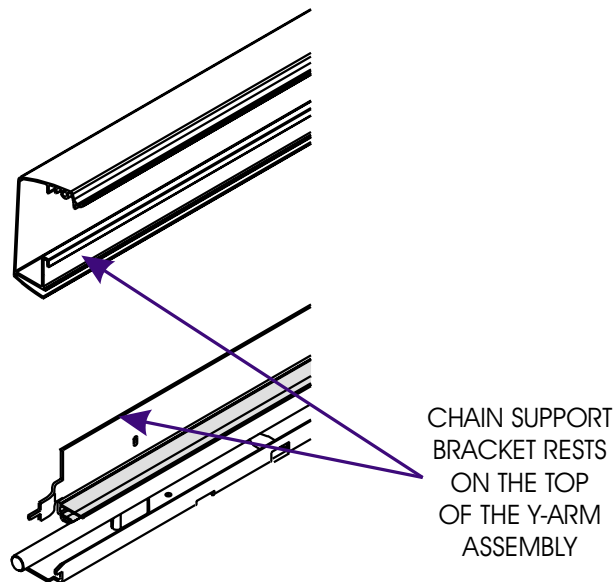
The right side of the Trailing Cable (the side connected to the Main PWA) must extend beyond the Stabilizer Bracket by 5" (4 7/8" - 5 1/8") or 128mm (125mm - 131mm.)

2. Slip the ferrite around the Trailing Cable Assembly and insert the right side of the Trailing Cable Assembly through the access hole provided in the Right Side plate.
3. Slide the Carriage Assembly and Floating Carriage Cover Assembly to the far left side of the Slide Shaft. While ensuring a 5" (125mm) overhang on the right side, position the Trailing Cable Assembly over the Stabilizer Bracket and slowly lower it onto the bracket. Ensure that the Trailing Cable Assembly goes on straight and that there are no buckles in the cables. Firmly press the Trailing Cable Assembly onto the tape to secure it into position.
4. Connect the right end to the Main PWA, the right Carriage cable (longer cable) to the J1 connector and the left Carriage cable (shorter cable) to the J2 connector.
5. Move the Carriage Assembly and Floating Carriage Cover Assembly to the right. Insert the Strain Reliefs (with Trailing Cables and ferrite) onto the Carriage Assembly by sliding it onto the Strain Relief Supports until it snaps firmly into place.

6. Reposition the Floating Carriage Cover/Right Support Bracket Assembly and the Left Support Bracket around the Carriage Assembly. Secure the Left Support Bracket to the Floating Carriage Assembly. Torque to 15 in-lbs.
7. Install the Top and Right Covers following procedures outlined earlier in this chapter.

## Remove the Stabilizer Bracket and Encoder Strip

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Ink Delivery System, Carriage Assembly and Trailing Cable Assembly following procedures outlined earlier in this chapter.
3. Remove the Chain Support Bracket by slightly tilting the top of the Chain Support Bracket towards the front of the printer and lifting it straight up. See Figure 5-27.



**Figure 5-27. Stabilizer Bracket Installation/Removal.**

4. Remove the Stabilizer Bracket from the Y-Arm Assembly by removing the four alignment Allen screws and washers located on the back of the Y-Arm Assembly.

## **CAUTION**

The Encoder Strip is not a field removable item. The entire Stabilizer Bracket Assembly with the Encoder Strip is to be replaced if the Encoder Strip is damaged.

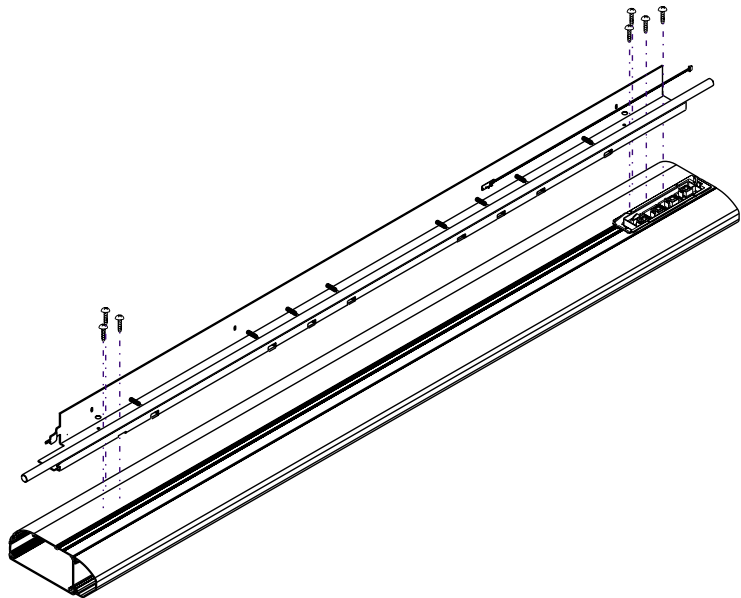
### **Install the Stabilizer Bracket and Encoder Strip**

1. Install the Stabilizer Bracket Assembly (with Encoder Strip) onto the Y-Arm Assembly using the four alignment Allen screws and washers. Hand tighten only.
2. Install the Chain Support Bracket onto the Stabilizer Bracket Assembly by placing the Chain Support Bracket onto the Stabilizer Bracket with a slight forward tilt.
3. Install the Carriage Assembly, Trailing Cable Assembly and Ink Delivery System following procedures outlined earlier in this chapter.
4. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.
5. Perform the Head Height Adjustment procedures found in Chapter 3 of this service manual.

### **Remove the Y-Arm Assembly, Pinch Rollers, Slide Shaft, and AutoLoad Sensor**

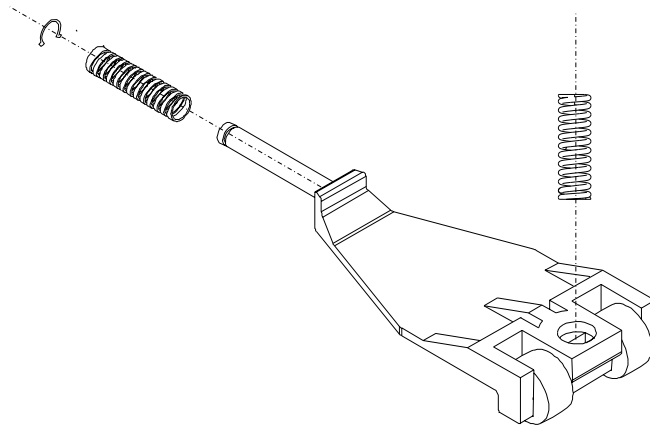
1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Ink Delivery System, Carriage Assembly and Trailing Cable Assembly following procedures outlined earlier in this chapter.
3. Remove the Stabilizer Bracket Assembly following procedures outlined earlier in this chapter.

4. Disconnect the AutoLoad Sensor connector at the J13 location on the Main PWA. Grasp the AutoLoad Sensor connector with the thumb and forefinger and pull straight out.
5. Remove the seven screws that secures the Y-Arm Assembly to the Platen. See Figure 5-28.



**Figure 5-28. Y-Arm Installation/Removal.**

6. The pinch rollers are held on by a small C clamp located on the back of the Y-Arm Assembly. See Figure 5-29. While holding the pinch roller, remove the C clamp and move the pinch roller towards the front of the Y-Arm Assembly until it clears the back of the Y-Arm Bracket.



**Figure 5-29. Pinch Roller.**

7. Spin the back of the pinch roller to either side and remove the back spring.
8. Carefully tilt the back of the pinch roller upwards. This brings the front of the pinch roller down, away from the Slide Shaft. Carefully remove the spring that is going into the Slide Shaft from the top of the pinch roller.
9. Remove the pinch roller.
10. From the bottom of the Y-Arm Assembly, remove the four screws that secure the Slide Shaft and its two supports from the Y-Arm Assembly.
11. Remove the two screws that secure the AutoLoad Sensor to the Y-Arm. Remove the AutoLoad Sensor wires from the four wire clamps on the back part of the Y-Arm Bracket.

## **Install the Y-Arm Assembly, Pinch Rollers, Slide Shaft, and AutoLoad Sensor**

1. Install the AutoLoad Sensor Assembly into the back part of the Y-Arm Bracket. Torque to 6 in-lbs.
2. Route the AutoLoad Sensor wires through the four wire clamps on the back part of the Y-Arm Bracket.
3. Install the Slide Shaft and its supports to the Y-Arm Assembly. Torque to 8 in-lbs.
4. Insert the back compression spring onto the shaft of the pinch roller and push the back of the shaft through the back of the Y-Arm Assembly. Install the C clamp around the shaft of the pinch roller.
5. While compressing the forward pinch roller spring with a screwdriver (or other flat object), position the pinch roller onto the Y-Arm Assembly until the forward spring is located under the hole in the Slide Shaft. Release the spring and verify that the spring enters the hole in the Slide Shaft and that no kinks are present in the spring.
6. Perform steps 4 and 5 for all pinch rollers.
7. Secure the Y-Arm Assembly to the Platen. Torque to 15 in-lbs.
8. Install the Stabilizer Bracket, Carriage Assembly and Trailing Cable Assembly following procedures outlined earlier in this chapter.
9. Install the Ink Delivery System following procedures outlined earlier in this chapter.
10. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.
12. Perform the Head Height Adjustment procedures found in Chapter 3 of this service manual.

## **Remove the Gap Sensor (NovaJet 880 only)**

### **To remove the print gap sensor:**

1. Remove the top cover by pulling on the retracting stop at the left end, remove by pulling cover to the left slightly to dislodge tab at the right end.
2. Locate and remove the 2 inside right cover screws.
3. Locate and remove the 3 bottom right cover screws.
4. Disengage the retracting latch between right cover and rear cover, pull up and ease right cover over on one side.
5. Remove two control panel connections to the Main PWA.
6. Remove the right cover.
7. Disconnect print gap sensor from J3 wiring harness extension plug. Remove 2 screws securing sensor. Twist sensor slightly and remove.

## **Remove the Lower Roller Assembly, Stepper Motor and Vacuum Fan (NovaJet 850)**

The Inner Platen contains the Lower Drive Roller Assembly, the Vacuum Fan Assembly(ies), the Stepper Motor Assembly, Drive Shaft Supports, and two Foam Blocks. These parts are collectively referred to as the Inner Platen Parts.

## **NOTE**

The removal of the Lower Drive Roller Assembly and Vacuum Fan(s) is easier if they are accessed from the left side of the Platen.

1. Remove the Top, Left and Right Covers following procedures outlined earlier in this chapter.
2. Remove the Right Sideplate Assembly following procedures outlined earlier in this chapter.

3. Remove the Service Station following procedures outlined earlier in this chapter.

## **CAUTION**

Be careful when removing any foam blocks so that it does not tear. It is very important to have an intact foam block to produce sufficient vacuum inside the Platen. This is required to properly hold the media down onto the Platen.

4. Using the access gained by removing the Right Sideplate and the Service Station, remove the right foam block from between the Lower Drive Roller Assembly and the Servo Motor.
5. Remove the Ink Delivery System following procedures outlined earlier in this chapter.
6. Remove the Left Assembly following procedures outlined earlier in this chapter.

## **NOTE**

The 42 inch model has one Vacuum Fan and Exhaust assembly while the 60 inch model has two sets of Vacuum Fans and Exhausts.

7. Remove the four (eight) screws on the bottom of the Platen which hold the Fan Exhaust(s) in place.
8. While holding the Vacuum Fan through the hole where the Exhaust assembly was, remove the 3 screws on the bottom of the Platen that secure the Vacuum Fan(s) . Do not allow the screws to come out at an angle.
9. Remove the Platen Plug from under the Platen.
10. Remove the black flat-head screws from the top of the Platen that holds the Center Support in place. Remove the Center Support through the Platen Plug hole.

11. Remove the black flat-head screws from the top of the Platen that holds the left and right Drive Shaft Supports in place.

**CAUTION**

It may be necessary to loosen (do not remove) the screws that secure the Y-Arm Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

**CAUTION**

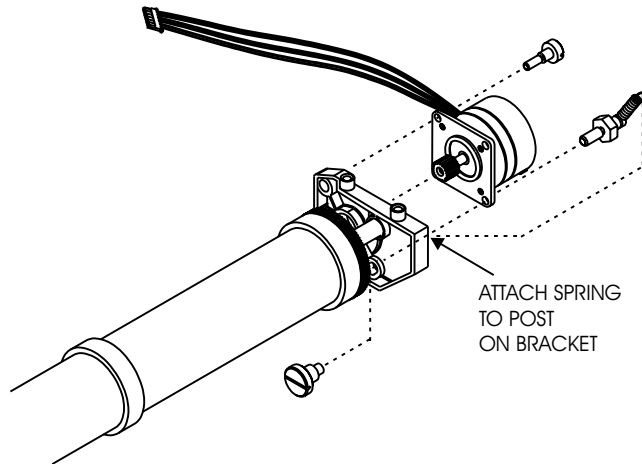
It may be necessary to loosen (do not remove) the screws that secure the left Leg Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

**CAUTION**

The Fan Assemblies will be removed at the same time that the Lower Drive Roller Assembly is removed. Exercise extreme care that the fan assemblies do not drop out of the Platen when removing the Lower Drive Roller Assembly.

12. Carefully slide the Lower Drive Roller Assembly (and the Fan Assemblies) out of the left side of the Platen.

13. Remove the Stepper Motor Extension Spring from the Stepper Motor and the post on the Left Lower Drive Shaft Bracket. See Figure 5-30.



**Figure 5-30. Stepper Motor Removal/Installation.**

14. Remove the hardware securing the Stepper Motor to the Left Lower Drive Shaft Bracket and remove the Stepper Motor.

### **Install the Lower Roller Assembly, Stepper Motor and Vacuum Fan (NovaJet 850)**

1. Loosely attach the Stepper Motor to the Lower Roller bracket using Stepper Motor hardware as shown in Figure 5-30.
2. Attach the Stepper Motor tension spring to the Stepper Motor and the Lower Roller Bracket. Tighten the Stepper Motor hardware to 8 in-lb of torque.

## **CAUTION**

It may be necessary to loosen (do not remove) the screws that secure the Y-Arm Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws

that protrude inside of the Platen while installing the Lower Drive Roller Assembly.

## CAUTION

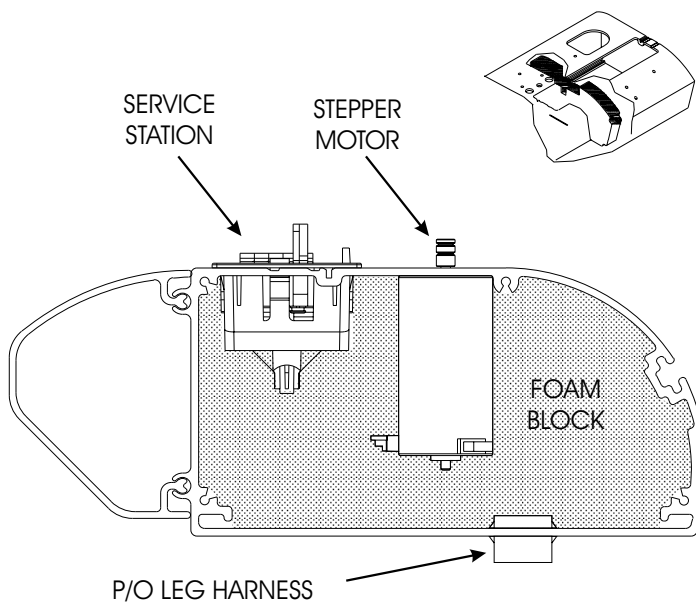
It may be necessary to loosen (do not remove) the screws that secure the left Leg Assembly to the Platen so that the Lower Drive Roller Assembly clears the ends of the screws that protrude inside of the Platen when removing the Lower Drive Roller Assembly.

## NOTE

Ensure that the Lower Drive Supports and Fan Assemblies are oriented in the correct position before inserting into the Platen.

3. Slide the right side of the Lower Drive Roller Assembly inside of the left side of the Platen until the first roller is inserted.
4. Position and hold one of the Fan Assemblies under the Lower Drive Roller Assembly and between the first and second rollers. Continue to insert the Lower Drive Roller Assembly into the Platen.
5. Position and hold the other Fan Assembly (for 60 inch model only) under the Lower Drive Roller Assembly. Continue to insert the Lower Drive Roller Assembly completely into the Platen.
6. Reaching inside the Fan Exhaust hole under the Platen, position and secure the Fan Assembly(ies).
7. Reinstall the Fan Exhaust Assembly(ies).
8. Install the Lower Drive Roller Assembly Left and Right Support Brackets.
9. Install the Center Support Bracket. Insert the Platen Plug.

10. Reinsert the right Foam Block. Make sure that the Stepper Motor and Fan(s) cables are exiting out of the back corner of the Foam Block. See Figure 5-31. The Foam Block is positioned between the Stepper Motor and the Servo Motor. Make sure it is not tilted at an angle.



**Figure 5-31. Inside Platen, Right Side.**

11. Reinsert the Service Station.
12. Reinstall the Right Sideplate. Ensure that all cables from inside the Platen are exiting out of the large hole in the Sideplate.
13. Reinstall the left Foam Block.
14. Reinstall the Left Frame Assembly.
15. Install the Ink Delivery System following procedures outlined earlier in this chapter.
16. Install the Top, Left and Right Covers following procedures outlined earlier in this chapter.

## **Remove the Lower Roller Assembly, Stepper Motor and Vacuum Fan (NovaJet 880)**

1. To remove the stepper motor/lower roller, first remove power from the printer.
2. Unplug the dryer power cord and disconnect the dryer logic cable.
3. Remove dryer by pulling locking pins and lifting straight up.
4. Remove the flattening roller thumb screws and remove the flattening rollers.
5. Disconnect the SEH print server from the parallel port if connected.
6. Remove all cartridges from the printer by lifting the valve actuator and pulling the septum needle free. Remove all ink reservoirs by depressing on the valve tabs.
7. Remove the top cover by pulling on the retracting stop at the left end, remove by pulling cover to left slightly to dislodge tab at the right end.
8. To remove the right cover, locate and remove the 2 inside right cover screws. Locate and remove the 3 bottom right cover screws.
9. Disengage the retracting latch between right cover and rear cover, pull up and ease right cover over on one side.
10. Remove two control panel connections to the Main PWA.
11. Remove the right cover.
12. To remove the left cover, remove the two bottom screws securing the left cover. Using a flathead screwdriver insert tip into 4 cover tab slots and gently twist to release cover from slide plate. Disengage the retracting stop or latch between the left cover and rear cover. Pull up and remove the left cover.
13. Remove 6 ink delivery system carriage-cover securing screws; 3 screws are located on each side of carriage assembly. Remove trailing cable bracket.
14. Remove 2 screws at rear of printer which secure the ink delivery system and chain shelf. Remove the chain shelf. Remove 7 remaining screws which secure the ink delivery system. Lift the carriage cover and move to left side of printer, lift the metal bracket and simultaneously slide the ink delivery chain out of rear cover.

Remove the ink delivery system.

15. Ensure the ink delivery system carriage cover brackets are clear of the rear cover. Remove rear cover by lifting up and pulling away from the Y-Arm. Note: do not lose the 2 retracting stop springs.
16. Disconnect all Main PWA connections. Disconnect the power supply, servo motor, stepper motor, takeup/feed system, Autoload sensor, both vacuum fans, power supply cooling fan, both trailing cables, and two grounds. Remove 2 screws securing the right side electronics assembly and remove assembly by pulling straight out.
17. Disconnect the print gap sensor from takeup harness wiring. Remove the right side plate by removing 4 securing screws. Loosen the ferrite bracket screw to obtain clearance to pull sensor wiring and plugs through opening. Remove the right side plate.
18. Remove the ink delivery system carriage cover brackets and bushings off the slide shaft on either end of printer. Obtain the Belt Spacer Tool, provided in the training kit, to remove carriage belt. Position belt spacer tool in-between the frame tensioner and the left side plate. While holding the belt spacer tool turn the adjustable bolt to provide adequate tension to the back side of the frame tensioner. Remove carriage belt from the servo pulley.

## **CAUTION**

Avoid damaging the encoder strip!

19. Hold the belt spacer tool and turn the adjustable bolt to release tension on the frame tensioner spring. Remove the belt spacer tool.
20. Remove the service station by pulling on the tab at right side and lifting out. Remove the screw securing the torroid. Remove the grounding braid securing screw and nut by gaining access to screw through the right fixed-end beam.
21. Remove the servo motor by first removing the 2 screws securing the servo plate at underside of printer. While holding the motor, remove 2 securing screws and lower motor through right-end platen opening.
22. Remove the left side plate by removing the 6 securing screws.

Disconnect the 2 carriage electronic covers by pressing in on the inner tabs with a small tool. Disengage the trailing cables from the carriage ZIF connectors. At rear of printer disengage each strain relief from each carriage assembly using a small flat-head screwdriver – gently pry the securing foot to one side to release the strain relief. Caution: do not force strain relief or damage to carriage assembly may result.

23. Remove both carriage assemblies, belt, frame tensioner, idler, and spring by sliding assemblies gently off the left side of the slide shaft. Note: the carriage assemblies are connected together with a latch and tension spring - ensure the orientation is correct for installation (the right carriage assembly contains the sensor assemblies).
24. Remove the Y-Arm assembly by removing the 8 securing screws. Caution: do not damage trailing cable or sensor wiring during removal.
25. Remove the 2 middle platen section pin assembly compression springs by removing the securing screw.
26. Remove 3 screws from right leg and twist 90 degrees to gain access to screw holes.
27. Remove 4 screws securing the right fixed-platen end. Right stand leg will have to be twisted to gain access to screw holes. Move platen end away from stepper motor location and pull wiring free. Do not disconnect leg harness wiring. Caution: do not loosen or remove any main beam screws or improper printer alignment will result.
28. Remove the middle platen section by pulling straight up. Caution: do not tamper with the media thickness hand wheel until the printer is reassembled.
29. Remove the right side plate from the middle platen section by removing the 4 securing screws. Disconnect both vacuum fans by removing the 6 securing screws. Remove the exhaust grills by removing the 8 securing screws and lifting grills free. Disconnect lower roller assembly by removing the 6 securing screws. Remove the platen plug by forcing a screwdriver past lower roller and pounding out forcefully. Remove the center lower roller support bracket and bearing. Note: The thick arm of the bracket faces towards the front of the printer on reinstallation. Remove the stepper motor/lower roller assembly out the right side of platen. Caution: do not pull lower roller too hard as this may cause damage to the vacuum fans. The vacuum fans may have to be lifted over the pemnuts when removing.

## **NOTE**

The right side fixed nylon helical wedge and pin assembly/flange should not have to be removed unless the screw length prohibits lower roller removal. Three 1/8" and 5/32" allen head screws are used to secure these assemblies).

To remove the stepper motor from lower roller remove the 2 securing screws, 2 nuts, and spring. Note the orientation of the motor with respect to the lower roller. For new motor installations verify support bracket to motor gap is .005" to .015" on the non-screwed side using a feeler gauge.

### **Lower Roller Installation Tip (NovaJet 880)**

To install the lower roller/stepper motor assembly:

1. Place all assemblies on a flat surface. Ensure the vacuum fan openings are facing away from the stepper motor. Fan #1 should be between rollers 1 & 2 while fan #2 should be between rollers 3 & 4.
2. Install assemblies into printer together and lock vacuum fans in place first before attaching other assemblies.

## **NOTE**

The thick arm of the center support bracket faces towards the front of the printer on reinstallation.

### **Y-Arm Assembly Installation Tip (NovaJet 880)**

Before installing the Y-Arm assembly, loosely attach the right fixed-platen end screws – do not tighten.

## **NOTE**

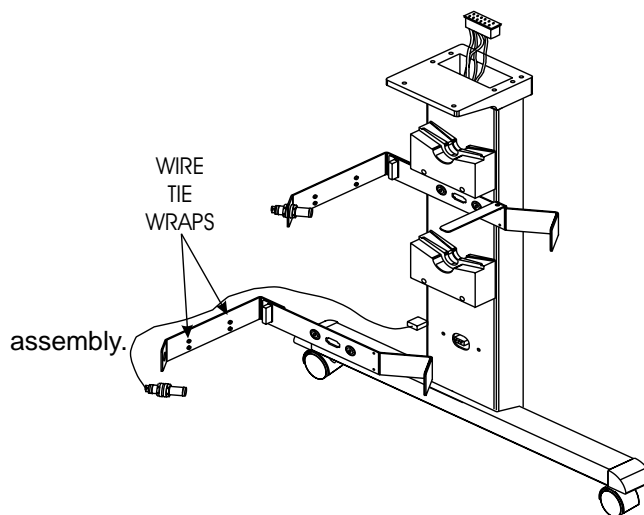
When installing the Y-Arm assembly alignment of the print head is referenced to the left fixed-platen end. Install Y-Arm by tightening the 4 screws on the left side first, followed by the right side screws. Ensure the cutter groove is straight across all three platen sections.

## Remove the Media Take-Up and Feed Sensor Brackets and Sensors

### NOTE

The sensors for the media Take-Up and Feed Assembly are identical, but the brackets that they mount to have distinct differences. The top bracket has an additional extended arm attached to help in directing the media from blocking the sensor's beam path. Ensure that the bracket is being replaced with the correct bracket.

1. Remove all media and media rollers from the printer.
2. Disconnect the sensor leads from the printers leg assembly by squeezing the sides of the connector to release the quick disconnect latches.
3. With a pair of wire cutters, cut the wire tie wraps (see Figure 5-32) that is securing the sensor leads to the sensor bracket.
4. Remove the sensor by unscrewing the plastic nut off of the front of the sensor. Pull the sensor out of the bracket.
5. Remove the two screws securing the bracket to the leg



**Figure 5-32. Media Take-Up and Feed Sensor Removal.**

## **Install the Media Take-Up and Feed Sensor Brackets and Sensors**

1. Install the two screws securing the bracket to the leg assembly.
2. Insert the sensor into the hole on the sensor bracket, secure by screwing on the plastic nut onto the front of the sensor.
3. Route the sensor wires to the back of the bracket and secure the wires using two wire tie wraps.
4. Bringing the wire from under the bracket, attach the wire connector to the leg harness plug. Push connector in until firmly seated.

## **Remove the Media Take-Up and Feed Motors**

1. Remove all media and media rollers from the printer.
2. Remove the four screws holding the Cradle Idler to the leg assembly. See Figure 5-33.
3. Carefully slide the Cradle Idler assembly out of the leg assembly until the wires going to the motor can be removed.
4. Remove the wires from the motor.
5. From the back of the Cradle Idler, disconnect the tension spring from the post located on the Cradle Idler.
6. Remove the screw and washer holding the motor mount to the Cradle Idler. Carefully remove the motor, motor mount, and motor gear subassembly from the Cradle Idler.
7. Remove the C clamp that is securing the motor gear to the motor.
8. Remove the three screws, washers, and lock washers from the motor mount to remove the motor.

## **Install the Media Take-Up and Feed Motors**

1. Install the three screws, washers, and lock washers that secures the motor to the motor mount.
2. Install the motor gear to the motor. Secure with a C clamp.
3. Insert the motor, motor mount, and motor gear subassembly into the back of the Cradle Idler. Tilt the subassembly slightly while installing to align the motor gear with the opening on the top of the Cradle Idler.
4. Screw in the screw and washer that secures the motor mount to the Cradle Idler.
5. Attach the tension spring to the post on the Cradle Idler.
6. Position the Cradle Idler assembly in front of the hole in the leg assembly. Attach the wire connectors to the motor (red to the positive terminal, black to the negative terminal.)
7. Insert the Cradle Idler Assembly into the leg and secure with four screws.

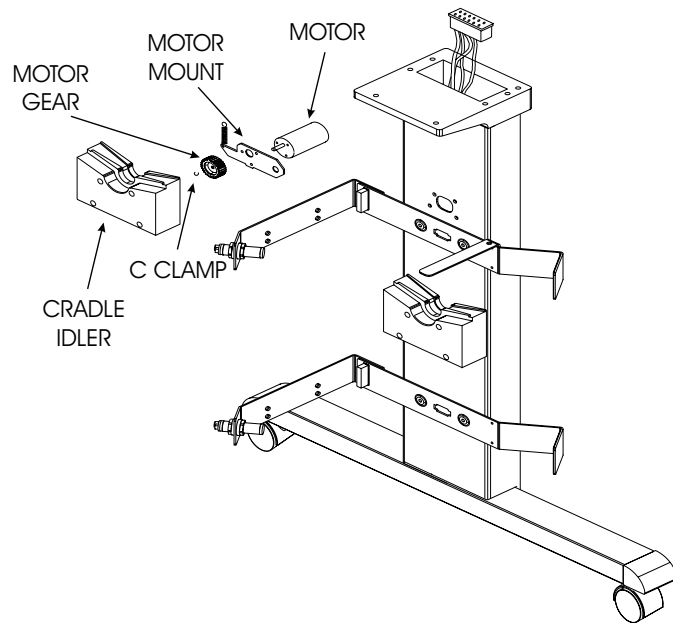


Figure 5-33. Media Take-Up and Feed Motor Removal.

### Remove the Thermal Dryer Assembly



Once the dryer is plugged in, there is continuous power being applied to the dryer, **even when the printer is turned off.**



**DISCONNECT POWER CORD BEFORE SERVICING!**

1. Lift the entire drying fan assembly off of the printer.

## Install the Thermal Dryer Assembly

1. Carefully place the Thermal Dryer Assembly onto the support brackets. See Figure 5-34. Secure and torque to 15 in-lbs.
2. Attach the data cable to the right side of the Thermal Dryer Assembly.
3. Attach the Thermal Dryer Assembly power cord the to back of the printer.

## Remove the Thermal Dryer Right Endcap Assembly

### NOTE

The Thermal Dryer Right Endcap Assembly contains the Printed Wiring Assembly for the Dryer.



Once the dryer is plugged in, there is continuous power being applied to the dryer, **even when the printer is turned off.**

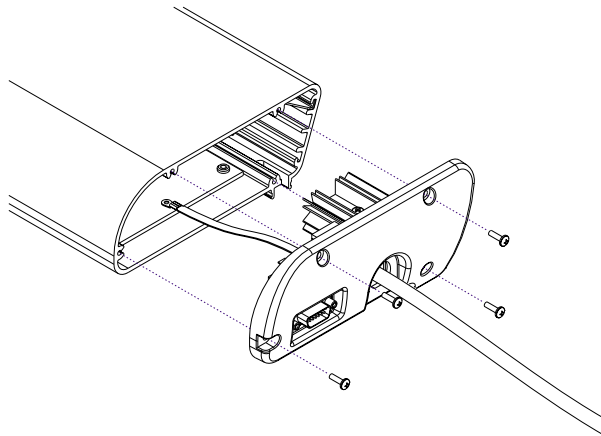


**DISCONNECT POWER CORD BEFORE SERVICING!**



This assembly emits heat by radiation.

1. Disconnect the Thermal Dryer Assembly power cord from the back of the printer.
2. Disconnect the data cable from the right side of the Thermal Dryer Assembly.
3. Locate and remove the four screws securing the Thermal Dryer Right Endcap Assembly. See Figure 5-35.



**Figure 5-35. Dryer Right Endcap Removal/Installation.**

4. Carefully pull the Right Endcap Assembly away from the main body of the Thermal Dryer Assembly until access is gained to disconnect the connections going to the Printed Wiring Assembly.

## **NOTE**

Some units may have very small servicing loops in the wiring of the Dryer Assembly. When removing the Right Endcap, the possibility exists that a connection may have been pulled loose elsewhere within the body of the dryer if extreme force is used to pull the endcap away from the main body. During assembly, ensure that all internal connections are good, including connections located at the left side of the dryer.

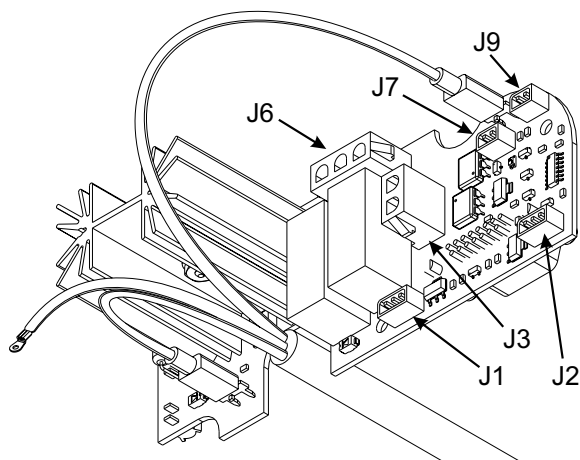
5. Disconnect the ground connection from the power cord to the main body of Thermal Dryer.
6. Disconnect all other connections going from the main body to the printed wiring assembly.

### **Install the Thermal Dryer Right Endcap Assembly**

## **NOTE**

Some of the units may have very small servicing loops in the wiring of the Dryer Assembly. When removing the Right Endcap, the possibility exists that a connection may have been pulled loose elsewhere within the body of the dryer if extreme force is used to pull the endcap away from the main body. During assembly, ensure that all internal connections are good, including connections located at the left side of the dryer.

1. Reconnect all the connections going from the main body to the printed wiring assembly on the Right Endcap Assembly. See Figure 5-36 and Table 5-1.



**Figure 5-36. Right Endcap Connector Locations.**

**Table 5-1. Thermal Dryer PWA Connections.**

J1 Fan 1	J6 Element, Right Conn
J2 Fan 2	J7 Thermistor
J3 Element, Left Conn	J8 Fuse, on back of PWA
J4 Power	J9 Thermistor
J5 Power	P1 Data cable

2. Reconnect the power cord ground to the main body of the Thermal Dryer.
3. Attach and secure the Right Endcap Assembly. Torque to 15 in-lbs.
4. Attach the data cable to the right side of the Thermal Dryer Assembly.
5. Attach the Thermal Dryer Assembly power cord the to back of the printer.

This chapter lists the items and their associated numbers for the parts and assemblies of the **NovaJet 800 Series** printers that are field replaceable. The list is in order of part name as identified in the assembly/disassembly chapter.

This list is to be used in conjunction with the assembly/disassembly procedures to acquire the necessary parts and properly install them into the printer.

The parts and assemblies may be ordered through your local authorized dealer or **ENCAD, Inc.**'s Technical Support and Service department.

FIGURE	ITEM	PART NAME	PART #
6-1	1	COVER, LEFT .....	214399-00
6-1	2	INK DELIVERY SYSTEM, 60" .....	217294-00
		INK DELIVERY SYSTEM, 42" .....	217295-00
6-1	3	FRAME, LEFT .....	214407-02
6-1	4	TUBE ASSY, RESERVOIR, BLUE .....	215930-00
		TUBE ASSY, RESERVOIR, GRAY .....	215933-00
6-1	5	CAP, RESERVOIR ASSY .....	215918
		PACK OF 4 .....	215987-00
6-1	6	RESERVOIR ASSEMBLY, WITH CAP AND TUBE ASSEMBLY BLUE .....	215971-00
		PACK OF 4 .....	216000-00
		GRAY .....	215972-00
		PACK OF 4 .....	216001-00

FIGURE	ITEM	PART NAME	PART #
6-1	7	FITTING, FEMALE, BLUE .....	214244-00
		FITTING, FEMALE, GRAY .....	214245-00
6-1	8	C-RING 7/16 .....	207789
		HARDWARE KIT .....	208810
		EASYPRIME .....	216072-01
		SDRAM, DIMM, 8M X 64MB, PC133 ....	215919-00
		ASSY, HEIGHT GAGE KIT .....	209996-1
		ADAPTER, HEAD HEIGHT .....	216131-00
		BELT REMOVAL TOOL .....	216629-00
		SERVER, 100BASET .....	218239-00

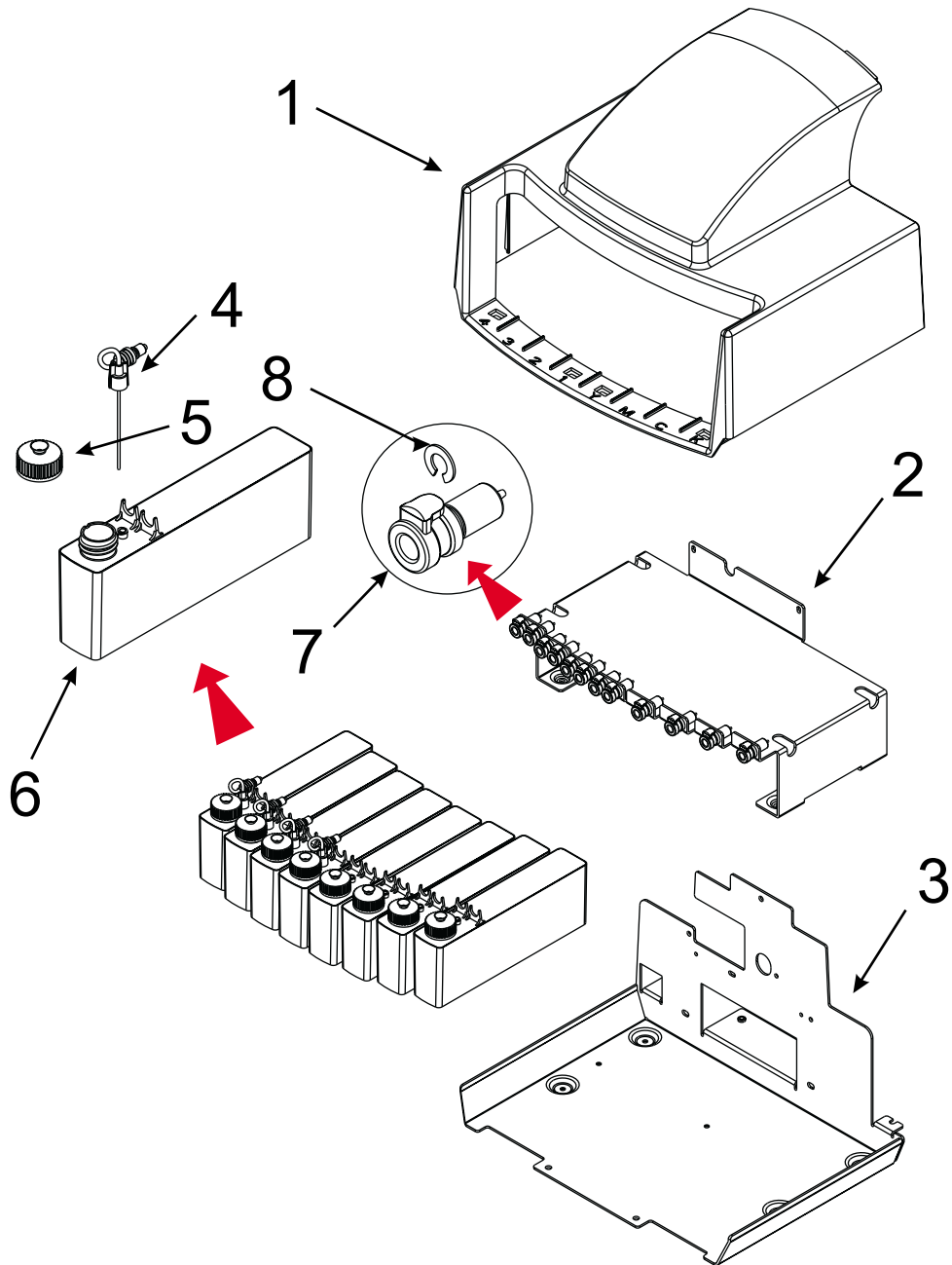


Figure 6-1. Left Side Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-2	1	SPRING, COMPESSION .....	209052
6-2	2	RETRACTING STOP, ASSEMBLY .....	208838-01
6-2	3	COVER ASSY, TOP, 60" .....	215571-00
		COVER ASSY, TOP, 42" .....	215572-00
6-2	4	CHAIN SUPPORT ASSEMBLY	
		60" .....	217283-00
		42" .....	217284-00
6-2	5	BELT, 60" .....	214370-01
		BELT, 42" .....	214371-01
6-2	6	SPRING, COMPRESSION (IDLER) .....	215348-00
6-2	7	IDLER ASSEMBLY .....	215386-00
6-2	8	FRAME, TENSIONER .....	203870-1
6-2	9	TRAILING CABLES, ASSEMBLY	
		60" .....	217038-00
		42" .....	217039-00
6-2	10	STABILIZER ASSY WITH ENCODER STRIP	
		60" .....	216660-00
		42" .....	216659-00
6-2	11	SPRING, COMP (PINCH ROLLER) .....	212542-00
6-2	12	RING, RETAINING, E-TYPE .....	200507
6-2	13	PINCH ROLLER ASSEMBLY .....	207486
6-2	14	SLIDE SHAFT, 60" .....	214381-00
		SLIDE SHAFT, 42" .....	214446-00
6-2	15	KNIFE DAMPER ASSY .....	202000
6-2	16	HEAD SPACING SENSOR ASSY .....	217120-01
		(NOVAJET 880 ONLY)	
6-2	17	AUTOLOAD SENSOR ASSY .....	215182-00

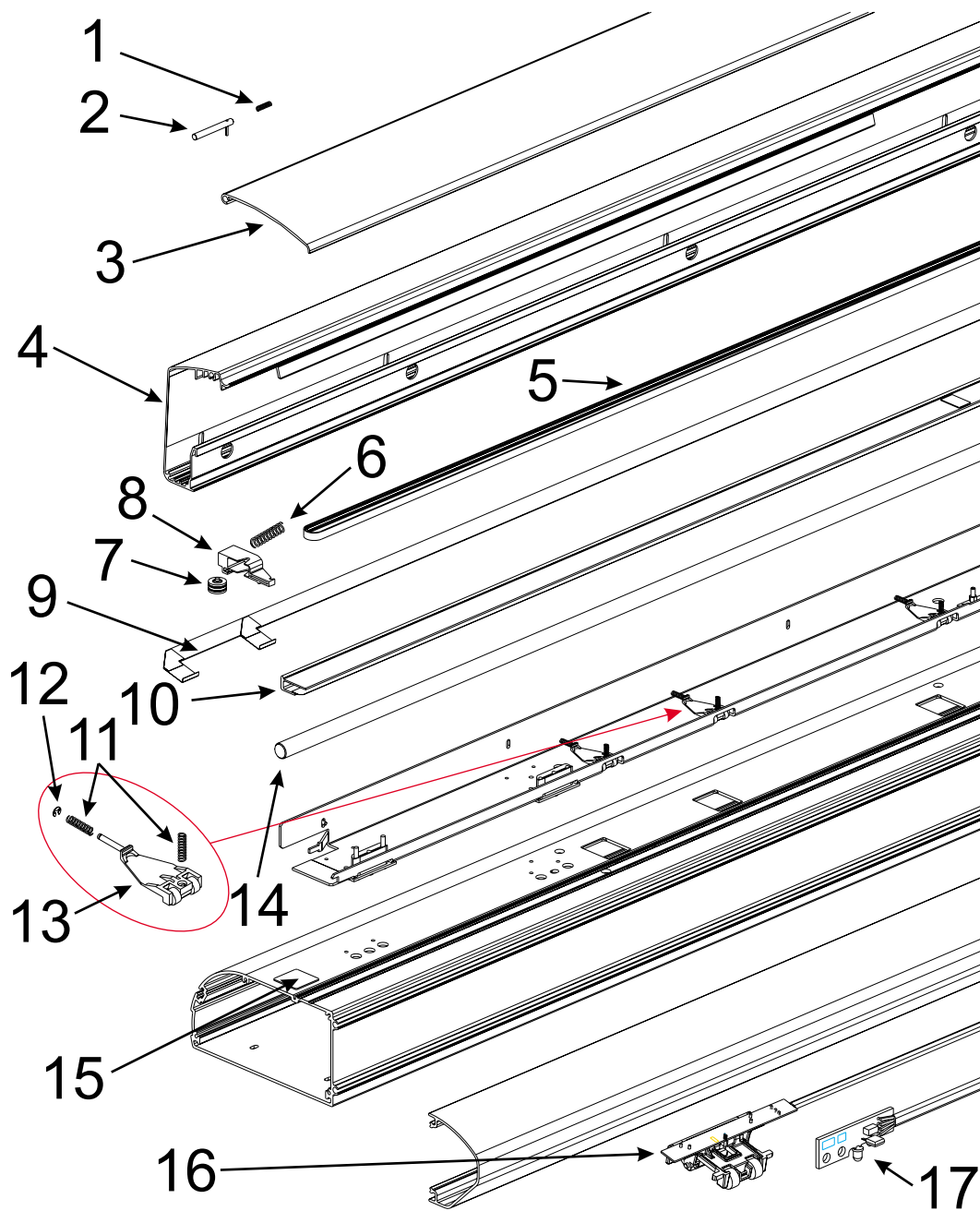


Figure 6-2. Platen and Above Parts Breakdown.

FIGURE	ITEM	PART NAME	PART #
6-3	1	COVER ASSEMBLY, WITH KEYPAD AND DISPLAY, RIGHT .....	215350-00
6-3	2	KEYPAD ASSEMBLY .....	209096-3
6-3	3	REFLECTIVE DISPLAY ASSY .....	210068-04
6-3	4	MAIN PRINTED WIRING ASSY NOVAJET 850 .....	216632-00
		NOVAJET 880 .....	218972-12
6-3	5	POWER ENTRY MODULE .....	215349-00
6-3	6	FAN COOLING, POWER SUPPLY .....	215566-00
6-3	7	POWER SUPPLY ASSEMBLY .....	210010-02
6-3	8	GROUND STRAP, 2.5" .....	209160
6-3	9	BASE PLATE, RIGHT .....	214385-01
6-3	10	GROUND STRAP, 10" .....	209159
6-3	11	SIDEPLATE .....	212761-02
		PARALLEL CABLE, SMALL, 15" .....	215466-00
		GROUND STRAP, 2 IN, (INSIDE COVER ASSEMBLY) .....	209606

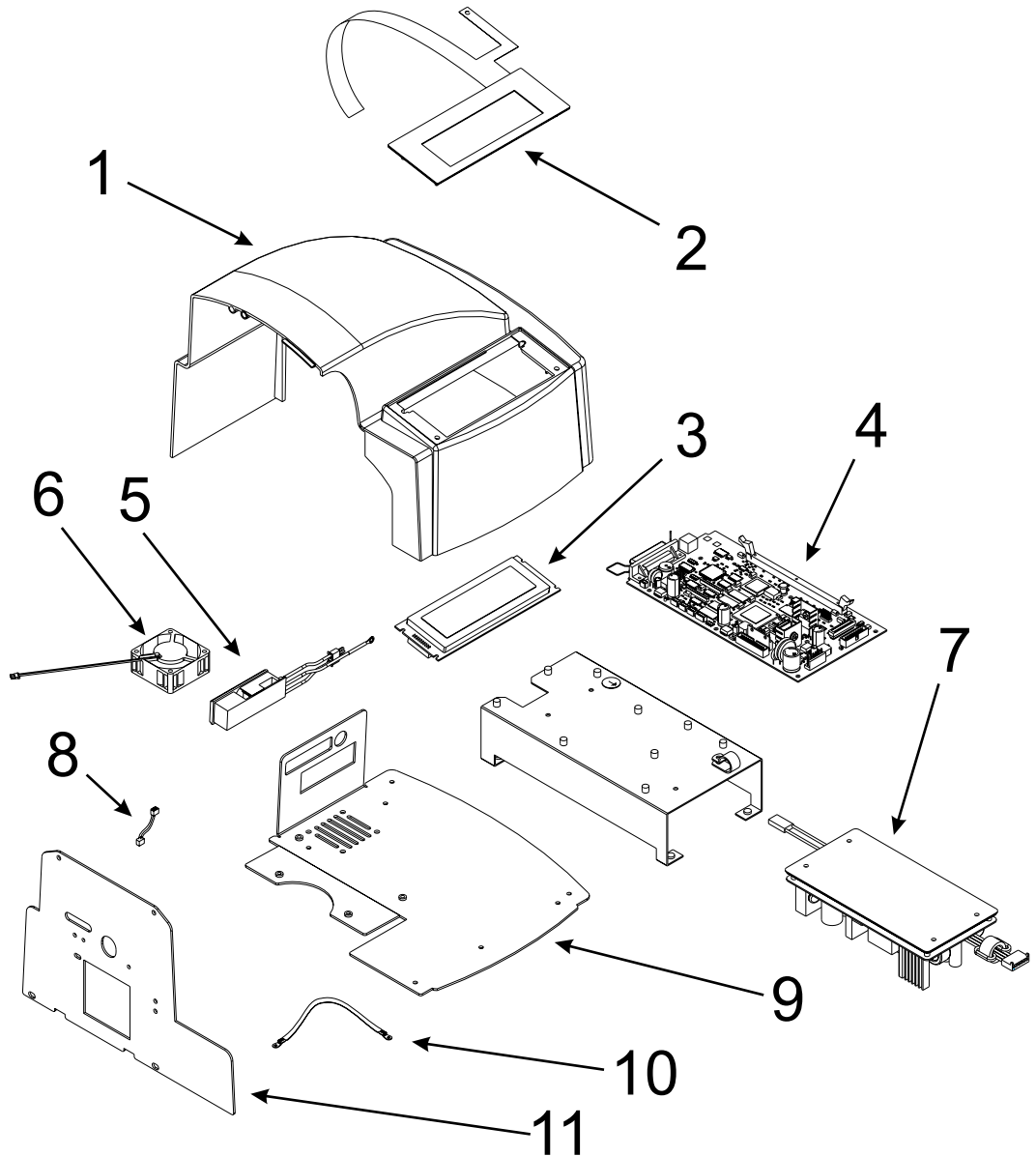


Figure 6-3. Right Side Parts Breakdown.

FIGURE ITEM		PART NAME	PART #
6-4	1	HARNESS, DRYER/WINDER	
		NOVAJET 850 .....	215188-00
		NOVAJET 880 .....	217886-01
6-4	2	MOTOR ASSY, SERVO .....	215704-01
6-4	3	BLOCK, RIGHT FOAM .....	215178-00
6-4	4	STEPPER MOTOR ASSY, W/ GEAR AND FERRITE .....	214376-00
6-4	5	BRACKET, LOWER ROLLER ASSY ....	208987-1
6-4	6	BLOCK, LEFT FOAM .....	209177
6-4	7	LOWER ROLLER ASSY, COMPLETE WITH STEPPER MOTOR AND BRACKETS	
		60" .....	217451-00
		42" .....	217452-00
6-4	8	GROUND STRAP, STEPPER .....	210837
6-4	9	FAN ASSEMBLY, VACUUM, 60" .....	214401-00
		FAN ASSEMBLY, VACUUM, 42" .....	210140
6-4	10	EXHAUST, GRILL .....	204976
6-4	11	FAN ASSY, VACUUM, 60" ONLY .....	214402-00
6-4	12	SUPPORT, CENTER .....	216871-00
		SHAFT, CENTER SUPPORT .....	215252-00
		BEARING, BALL .....	207503
6-4	13	PLUG, PLATEN .....	215189-00

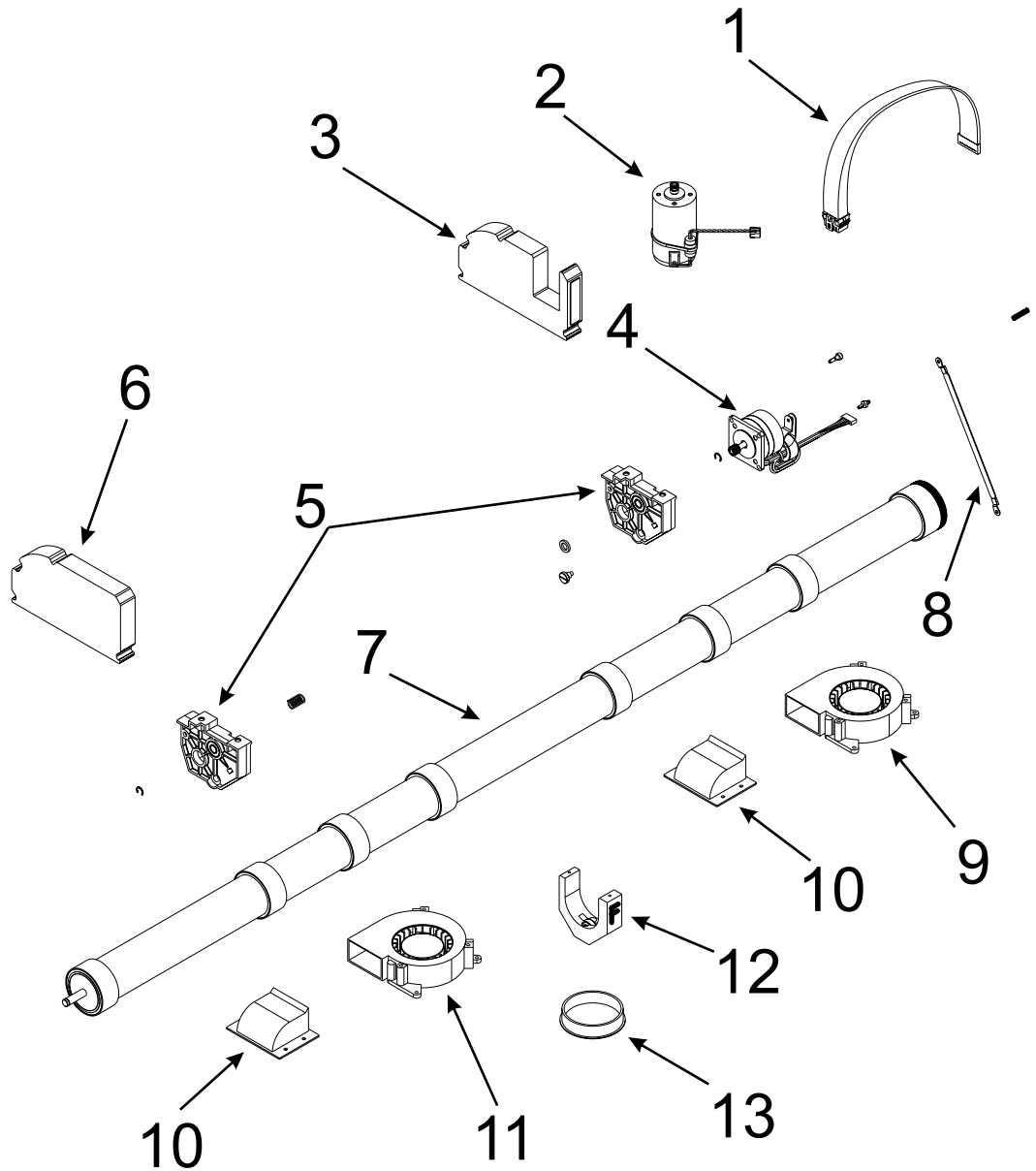
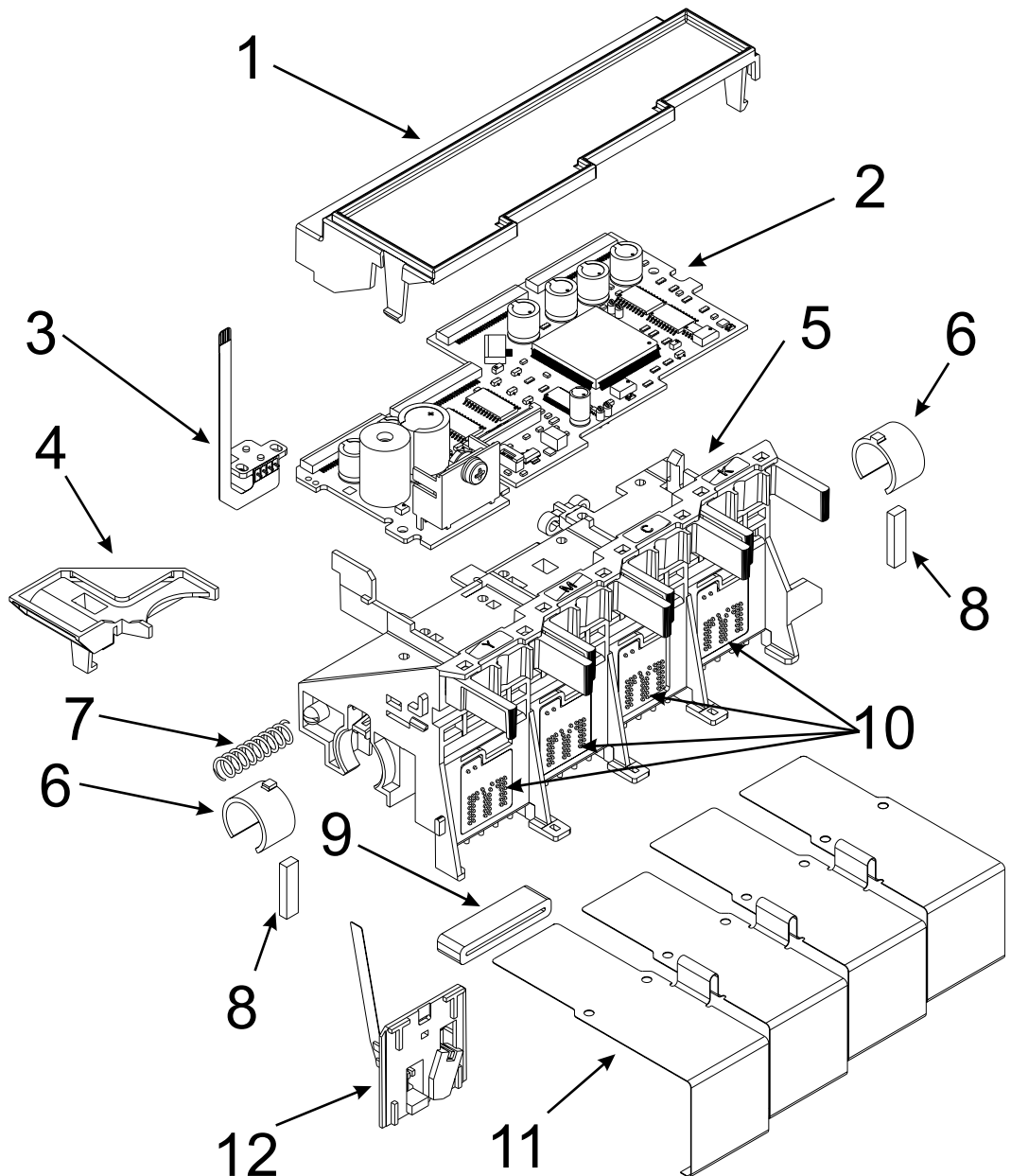


Figure 6-4. Inner Platen Parts Breakdown.

<b>FIGURE</b>	<b>ITEM</b>	<b>PART NAME</b>	<b>PART #</b>
6-5	1	COVER, CARRIER ELECTRONICS .....	215111-02
6-5	2	CARRIAGE PWA .....	214751-04
6-5	3	ENCODER SENSOR W/FLEX RIGHT SIDE CARRIAGE ONLY .....	209578-101
6-5	4	STRAIN RELIEF .....	215659-00
6-5	5	CARRIAGE FRAME ASSY, PARTIAL LEFT SIDE CARRIAGE .....	217561-00
		RIGHT SIDE CARRIAGE .....	217559-00
6-5	6	CARRIAGE BUSHING SET (2) .....	209568
6-5	7	SPRING, COMPRESSION .....	216840-00
6-5	8	PAD, BUSHING .....	212426-00
6-5	9	FERRITE, FLEX CABLE .....	210809
6-5	10	SPRING PAD, 208 JET .....	207572
6-5	11	PWB, FLEX, QUAD .....	215174-00
6-5	12	PAPER SENSOR W/FLEX RIGHT SIDE CARRIAGE ONLY .....	207180
CARRIAGE, COMPLETE ASSEMBLY			
		LEFT SIDE CARRIAGE .....	217560-01
		RIGHT SIDE CARRIAGE .....	217558-01



**Figure 6-5. Carriage Assembly Parts Breakdown.**

<b>FIGURE</b>	<b>ITEM</b>	<b>PART NAME</b>	<b>PART #</b>
6-6	1	ACTUATOR, VALVE .....	214886-01
6-6	2	CLIP, VALVE .....	214521-00
6-6	3	VALVE ASSEMBLY, BLUE .....	215703-01
		GRAY .....	215702-01
6-6	4	CARRIAGE COVER ASSY .....	215663-03
		P/O INK DELIVERY SYSTEM 60" ....	217294-00
		P/O INK DELIVERY SYSTEM 42" ....	217295-00
6-6	5	SUPPORT, LEFT, CARRIAGE COVER .....	214922-01
6-6	6	SUPPORT, RIGHT, CARRIAGE COVER .....	214923-01
6-6	7	CARRIAGE BUSHING SET (2) .....	209568
6-6	8	KIT, CARTRIDGE SEPTUM (4) .....	215505-01
6-6	9	WHEEL, CARRIAGE COVER ASSY ....	217233-01

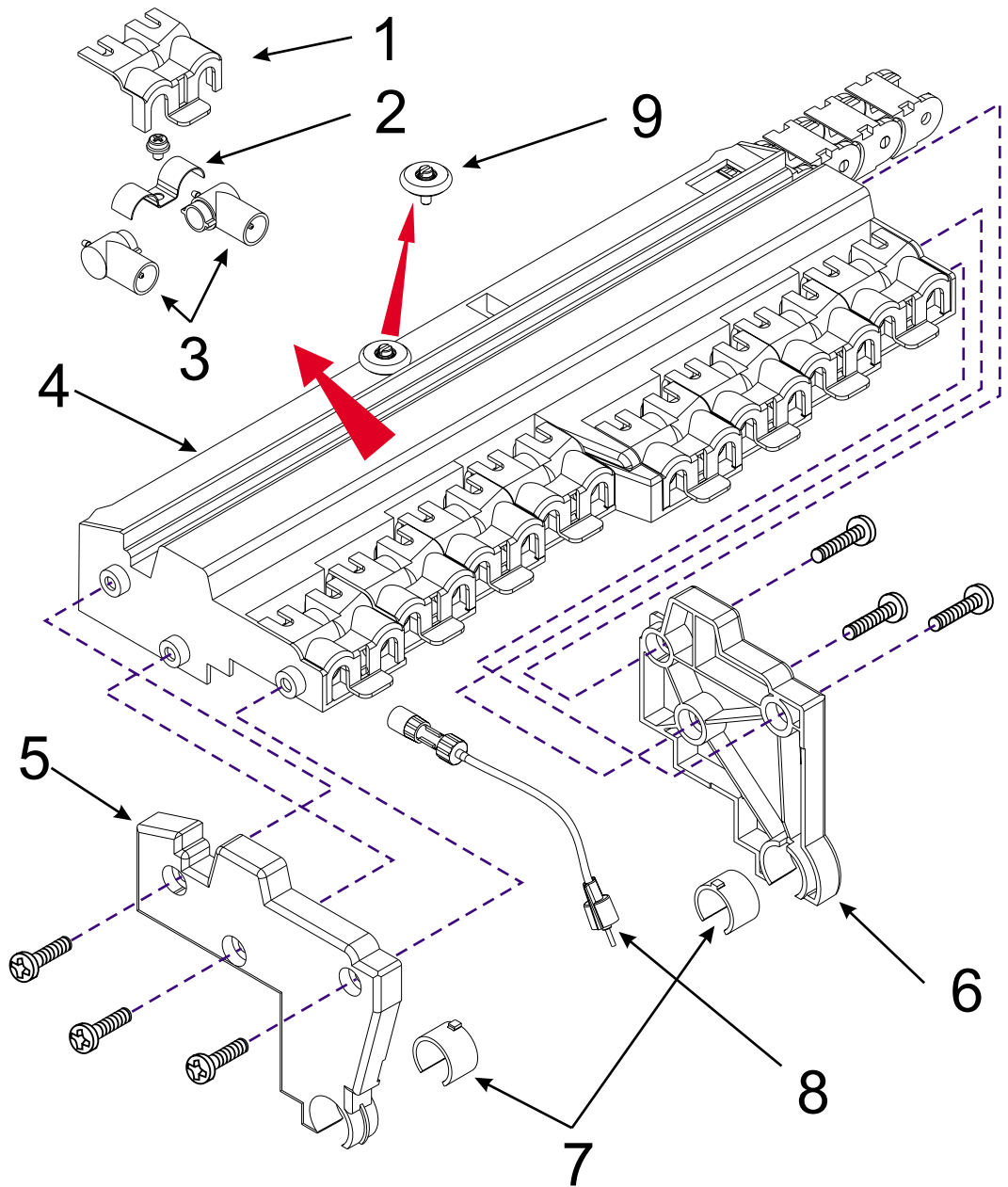
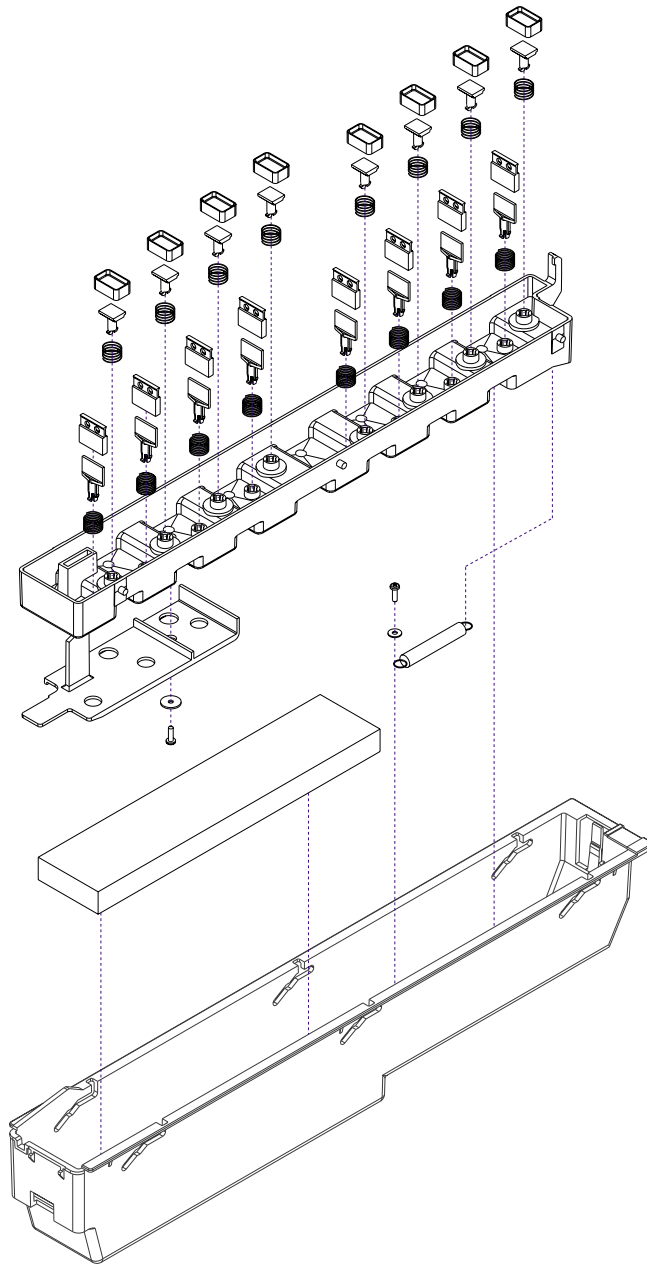


Figure 6-6. Floating Carriage Cover Parts Breakdown.

<b>FIGURE ITEM</b>	<b>PART NAME</b>	<b>PART #</b>
	SERVICE STATION ASSY .....	214393-03



**Figure 6-7. Service Station Parts Breakdown.**

<b>FIGURE</b>	<b>ITEM</b>	<b>PART NAME</b>	<b>PART #</b>
6-8	1	SHAFT ASSY, W/FIXED RT SIDE, GUIDE, ADJ (2) AND CLAMP (3) 60" ..... 207657-1 42" ..... 207657-2	
6-8	2	GUIDE, PAPER ADJUSTABLE ..... 207644	
6-8	3	CLAMP, GUIDE PAPER ..... 207659	
6-8	4	SENSOR, ASSY ..... 207727	
6-8	5	SENSOR, BRACKET, TOP, ASSY ..... 207656-1	
6-8	6	SENSOR, BRACKET, BTM, ASSY ..... 207752-1	
6-8	7	LEG DRIVE, WIRING ASSY W/TORROID ..... 215088-00	
6-8	8	MOUNT BRACKET, DRYER R NJ850 .. 214917-02	
6-8	9	MOUNT BRACKET, DRYER L NJ850 .. 214918-02	
6-8	10	MOTOR, DRIVE ..... 207767	
6-8	11	GEAR MOTOR, DRIVE ..... 207666	
6-8	12	CRADLE DRIVE ..... 207671	
6-8	13	STRIKEPLATE/ESD BRUSH ASSY ..... 211170	
6-8	14	CRADLE DRIVE, ASSY W/MOTOR (7) AND GEAR (8) ..... 207655-1	
6-8	14	CRADLE IDLER ..... 207667	
6-8	15	DRYER ASSEMBLY 60" (NJ850) ..... 216951-01 DRYER ASSEMBLY 42" (NJ850) ..... 216952-01 DRYER ASSEMBLY (NJ880) ..... 218997-00	
6-8	16	ENDCAP, RIGHT, ASSY (W/PWA) NOVAJET 850 ..... 215377-04 NOVAJET 880 ..... 218338-00 DRYER BRACKETS ASSY (NJ880) ..... 218802-00	

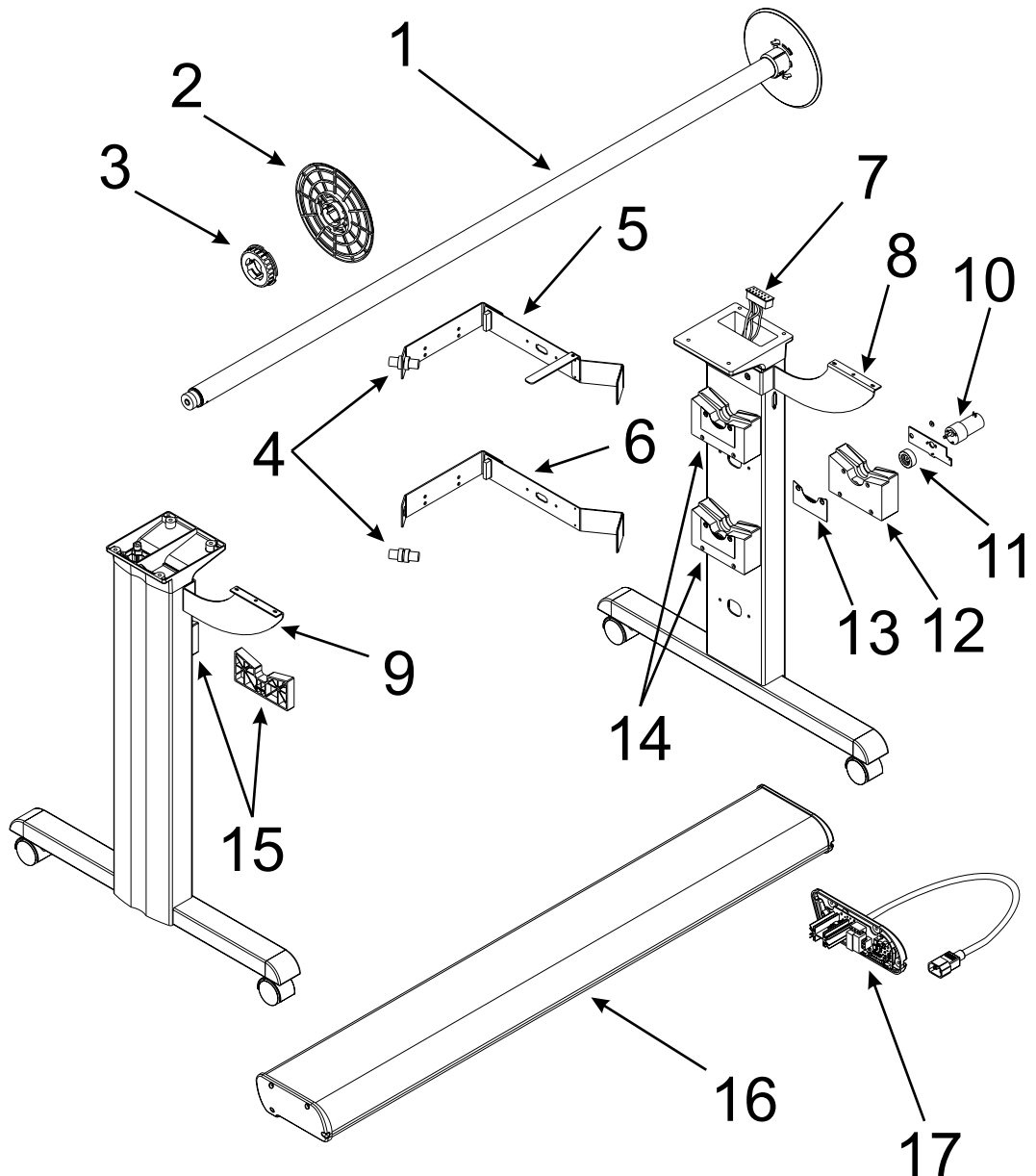


Figure 6-8. Power Feed and Take-Up Parts Breakdown.

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